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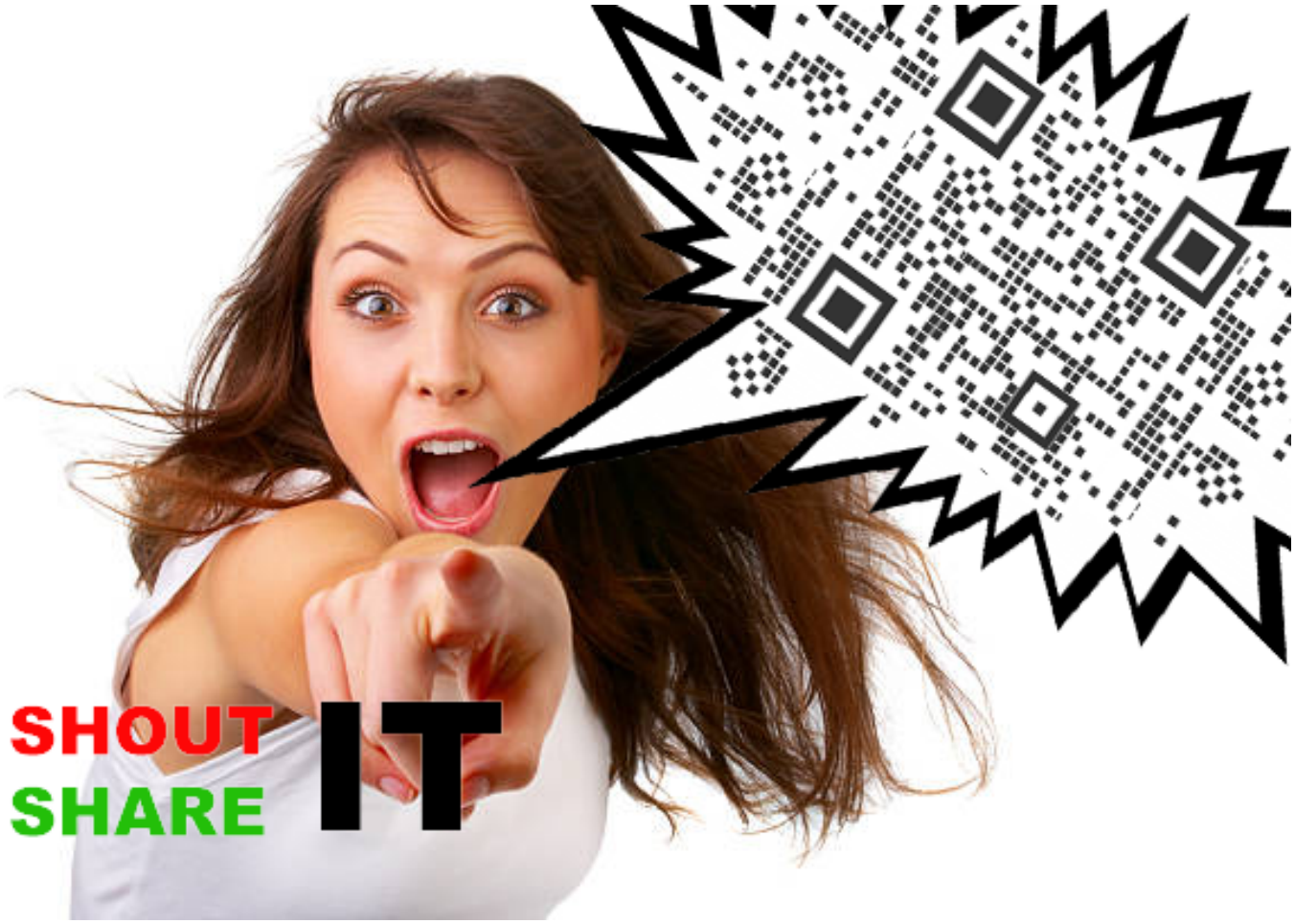
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TWENTY-SECOND ANNUAL REPORT

OF THE

Illinois State Beekeepers' Association

Organized February 26, 1891, at
Springfield, Illinois

Compiled by

M. G. DADANT,

Hamilton, Illinois

[Printed by authority of the State of Illinois.]

ILLINOIS STATE JOURNAL CO.
SPRINGFIELD, ILLINOIS
1923

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LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY.
HAMILTON, ILLINOIS, *March 15, 1923.*

To His Excellency, Len Small, Governor of the State of Illinois.

SIR: I have the honor to transmit herewith, the Twenty-second Annual Report of the Illinois State Beekeepers' Association.

M. G. DADANT, *Secretary.*

OFFICERS OF ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR 1923.

DR. ALBERT C. BAXTER . . . . . President
Springfield.

A. L. KILDOW . . . . . Inspector of Apiaries
Putnam.

C. H. ROBINSON . . . . . Vice President
Normal.

FRANK BISHOP . . . . . Vice President
Taylorville.

C. H. WILEY . . . . . Vice President
Harrisburg.

J. R. WOOLDRIDGE . . . . . Vice President
2021 W. 70th St., Chicago.

SAMUEL CUSHMAN . . . . . Vice President
6 East Lake St., Chicago.

M. G. DADANT . . . . . Secretary
Hamilton.

GEORGE SEASTREAM . . . . . Treasurer
Pawnee.

List of members in back of report. Also index.

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TWENTY-SECOND ANNUAL REPORT

OF THE

Illinois State Beekeepers' Association

For 1922

LIST OF ASSOCIATIONS FOR BEEKEEPING IN THE STATE OF ILLINOIS WITH THEIR OFFICERS.

COLES COUNTY BEEKEEPERS' ASSOCIATION.
CHARLES WALLACE, Secretary, Charleston.

COOK COUNTY BEEKEEPERS' ASSOCIATION.
SAMUEL CUSHMAN, President, 6 E. Lake St., Chicago.
A. G. GILL, Secretary, 230 W. Huron St., Chicago.

HANCOCK COUNTY BEEKEEPERS' ASSOCIATION.
E. J. BAXTER, President, Nauvoo.
J. H. LLOYD, Secretary, Carthage.

HENRY COUNTY BEEKEEPERS' ASSOCIATION.
ELMER KOMMER, President, Woodhull.
H. H. WILSON, Secretary, Geneseo.

ILLINOIS AND INDIANA BEEKEEPERS' ASSOCIATION.
MR. VOIGT, President, Danville.
C. O. HERRON, Secretary, Route No. 8, Danville.

ILLINOIS VALLEY BEEKEEPERS' ASSOCIATION.
B. F. BELL, President, Kingston Mines.
F. R. ISENBERG, Secretary, Pekin.

CHICAGO-NORTHWESTERN BEEKEEPERS' ASSOCIATION.
G. H. CALE, President, Hamilton.
J. FRANK HAAN, Secretary, DesPlaines.

SALINE COUNTY BEEKEEPERS' ASSOCIATION.
C. H. WILEY, President, Harrisburg.
EVERETT WEAVER, Secretary, Harrisburg.

CRAWFORD COUNTY BEEKEEPERS' ASSOCIATION.
HERMAN MCCONNELL, Secretary, Robinson.

SOUTHERN ILLINOIS BEEKEEPERS' ASSOCIATION.
J. R. WOOLDRIDGE, *President,* 2021 W. 70th St., Chicago.

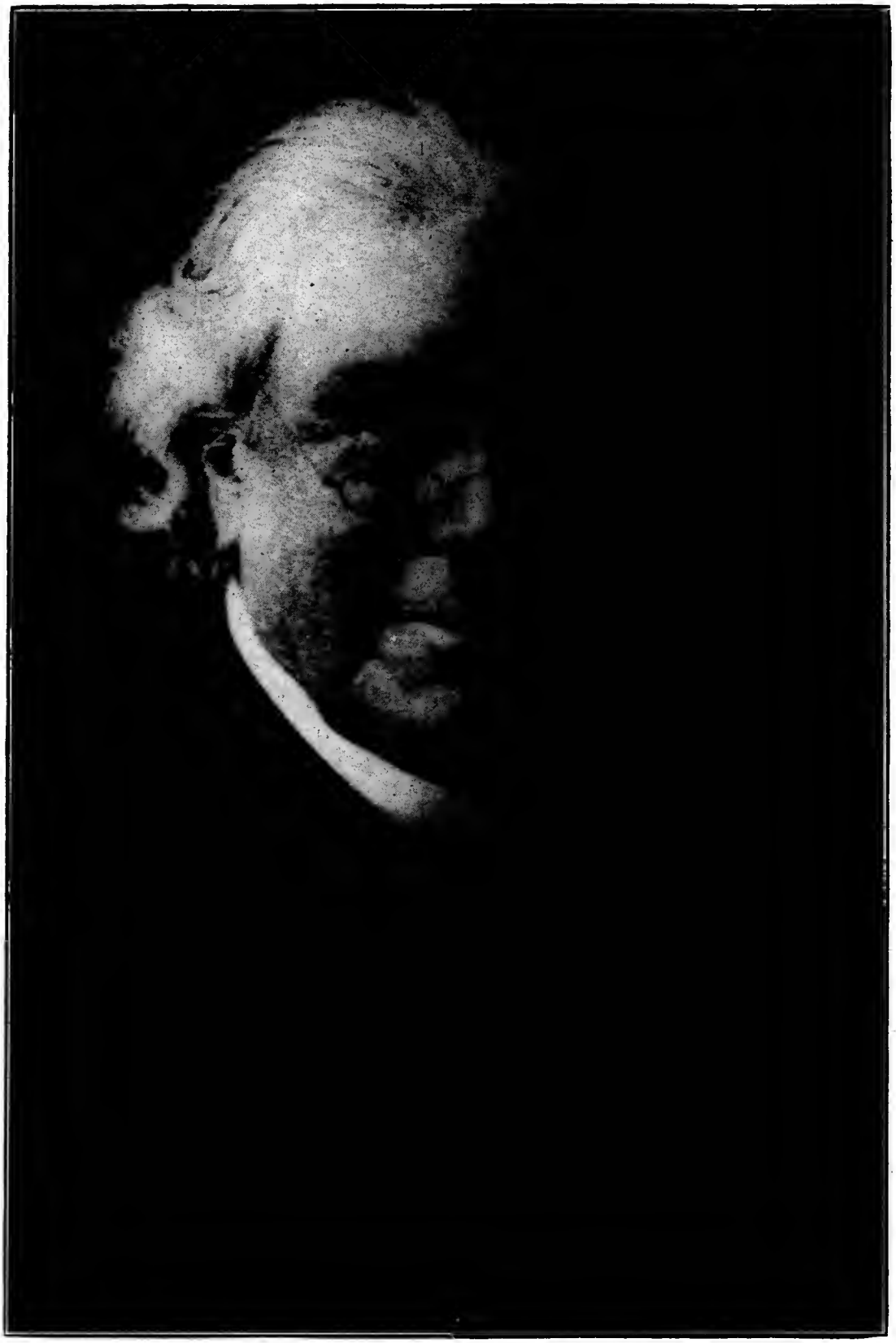
MACON COUNTY BEEKEEPERS' ASSOCIATION.
I. C. EVANS, President, 1060 W. Marietta, Decatur.

MCLEAN COUNTY BEEKEEPERS' ASSOCIATION.
DR. H. B. HENLINE, President, Bloomington.
W. B. BRIGHAM, Secretary, Bloomington.

POPE COUNTY BEEKEEPERS' ASSOCIATION.
W. M. PARKINSON, President, Golconda.
MISS MINNIE MICHEL, Secretary, Golconda.

CHRISTIAN COUNTY BEEKEEPERS' ASSOCIATION.
FRANK BISHOP, President, Taylorville.
W. H. STUMM, Secretary, Edinburg.

PULASKI COUNTY BEEKEEPERS' ASSOCIATION.
WAYNE LINGENFELTER, President, Ullin.
L. E. LINGENFELTER, Secretary, Ullin.



FATHER LANGSTROTH,
1810—1895
Inventor of the Movable Frame Hive.

MINUTES OF THE ANNUAL MEETING STATE BEEKEEPERS' ASSOCIATION DECEMBER, 1922.

The Annual Meeting of the Illinois State Beekeepers' Association was held at the St. Nicholas Hotel in Springfield, Ill., December 6 and 7, 1922; President Baxter presiding. Minutes of the 1921 meeting were read and approved. Auditing Committee composed of C. F. Bender, W. H. H. Stewart and Elmer Kommer was appointed. Resolution Committee was appointed composed of J. R. Wooldridge, W. H. Williams and Frank Bishop.

Papers were read or lectures given by the following: Allen Latham, E. R. Root, E. W. Atkins, C. O. Yost, C. P. Dadant, W. B. Brigham, J. R. Wooldridge, A. G. Gill, Geo. E. King and Elmer Kommer.

Report of the State Inspector of Apiaries, Kildow, was read and ordered filed.

Election of officers resulted in the following being selected: Dr. A. C. Baxter, Springfield, President; C. H. Robinson, Normal, First Vice President; Frank Bishop, Taylorville, Second Vice President; C. H. Wiley, Harrisburg, Third Vice President; J. R. Wooldridge, Chicago, Fourth Vice President; Samuel Cushman, Chicago, Fifth Vice President; M. G. Dadant, Hamilton, Secretary; Geo. Seastream, Pawnee, Treasurer.

Resolutions were filed by the Chicago-Northwestern Association as follows:

Resolved, The Chicago-Northwestern Beekeepers' Association hereby ask the Illinois State Beekeepers' Association in convention at Springfield, Ill., December 6-7, 1922, to pass a resolution which shall be presented to members of the Illinois State Legislature asking said Legislature to make laws and to appropriate funds that will enable Illinois to carry out a system of bee inspection like that now proving so successful in Indiana.

Resolved, The Chicago-Northwestern Beekeepers' Association in convention assembled respectfully request the Illinois State Legislature to appropriate a sufficient amount to adequately carry out a rational system of bee inspection in Illinois.

Report of the Auditing Committee was presented finding correct reports of Secretary and Treasurer for the past year showing balance in the treasury as of December 1, 1922 of $73.64 and recommending the acceptance of these reports. On motion and second the reports were accepted.

The following resolutions were presented by the committee and on motion and second were adopted.

1. *Be it Resolved*, That our worthy President prepare an article setting forth the merits of honey from a medical standpoint and its desirability and offer for publication and all other means of distribution.

2. *Resolved*, That we express our regret on the death of two of our members, Mr. W. H. Hyde, of New Canton, J. C. Wheeler, of Oak Park, and

resolved, that the sympathies of the Illinois State Beekeepers' Association be extended to their families in their loss.

3. *Resolved*, That we express our thanks to Mr. Root, Mr. Latham, Mr. Yost and Mr. Atkins and others for their attendance at this convention and for the very valuable information and help which they have given us.

4. The Illinois State Beekeepers' Association in convention in Springfield, Ill., December 6-7, 1922, realize the unpleasant fact that American foulbrood, a most deadly disease, among honey bees, is widely spreal throughout our State and unless ample aid be given by the State in the way of appropriation and amendments to the present Illinois bee laws, the beekeeping industry of our State is in serious danger of being annihilated, thus bringing about a loss to the State of an appalling sum of money. We call attention to Indiana, our sister state, whose location is no more favorable to the beekeeping industry than that of Illinois, yet it is far ahead of us as a honey producing state and is increasing rapidly. Records show, that Indiana a few years ago, was as badly infected or more so, with foulbrood as is Illinois today but sufficient funds were appropriated and such bee laws made by the Indiana Legislature as enabled it to employ a state bee inspector by the year straight time and under this inspector six or seven deputies working four to six months straight time. The results obtained proved to be very marked. Government reports of 1922 show Indiana leading all other states in colony average honey production, foulbrood being nearly cleaned from within its borders (less than 2% remaining).

We, the Illinois beekeepers, in convention hereby ask of the Director of Agriculture and the legislative body of Illinois to allow such appropriation and amend and enact such laws as will enable us to carry out a system of inspection and education similar to that of Indiana in order that Illinois may redeem the beekeeping industry and save the hundreds of thousands of dollars worth of honey that under present conditions owing to lack of funds, bee laws, inspection, lack of knowledge, and disease, can not be secured.

It was moved by A. G. Gill and seconded that we ask the Director of Agriculture and the Governor of the State and the State Legislature for an appropriation of $12,000 per annum for bee inspection. The motion carried.

It was moved and seconded that the President, aided by a committee of two of his own selection be put in charge of securing legislation and that he be urged to revise our foulbrood law to provide for State inspector on full time and deputies either part time or full time at fixed salaries. And furthermore, that the President and this committee be placed in full charge of securing such legislation calling on the Secretary and the membership for all such help as needed. The motion carried.

It was moved and seconded that the President of the University of Illinois and trustees thereof be asked for the establishment of a complete department of beekeeping at the University of Illinois, including teaching, investigation and extension. Motion carried.

There being no further business the meeting adjourned.

M. G. DADANT, *Secretary.*

THE PRESIDENT'S ADDRESS.

Members of The Illinois State Beekeepers' Association, Ladies and Gentlemen:

One year has passed since last we met in annual session and one more year has been added to the history of this Association, and it affords me great pleasure to greet and welcome you to this, the thirty-second annual meeting of The Illinois State Beekeepers Association.

This is an occasion we all look forward to with much pleasure. Here we meet our friends and those interested in our beloved industry, clasp their hand in greeting, meet and form new friendships, review the past and formulate plans for the future.

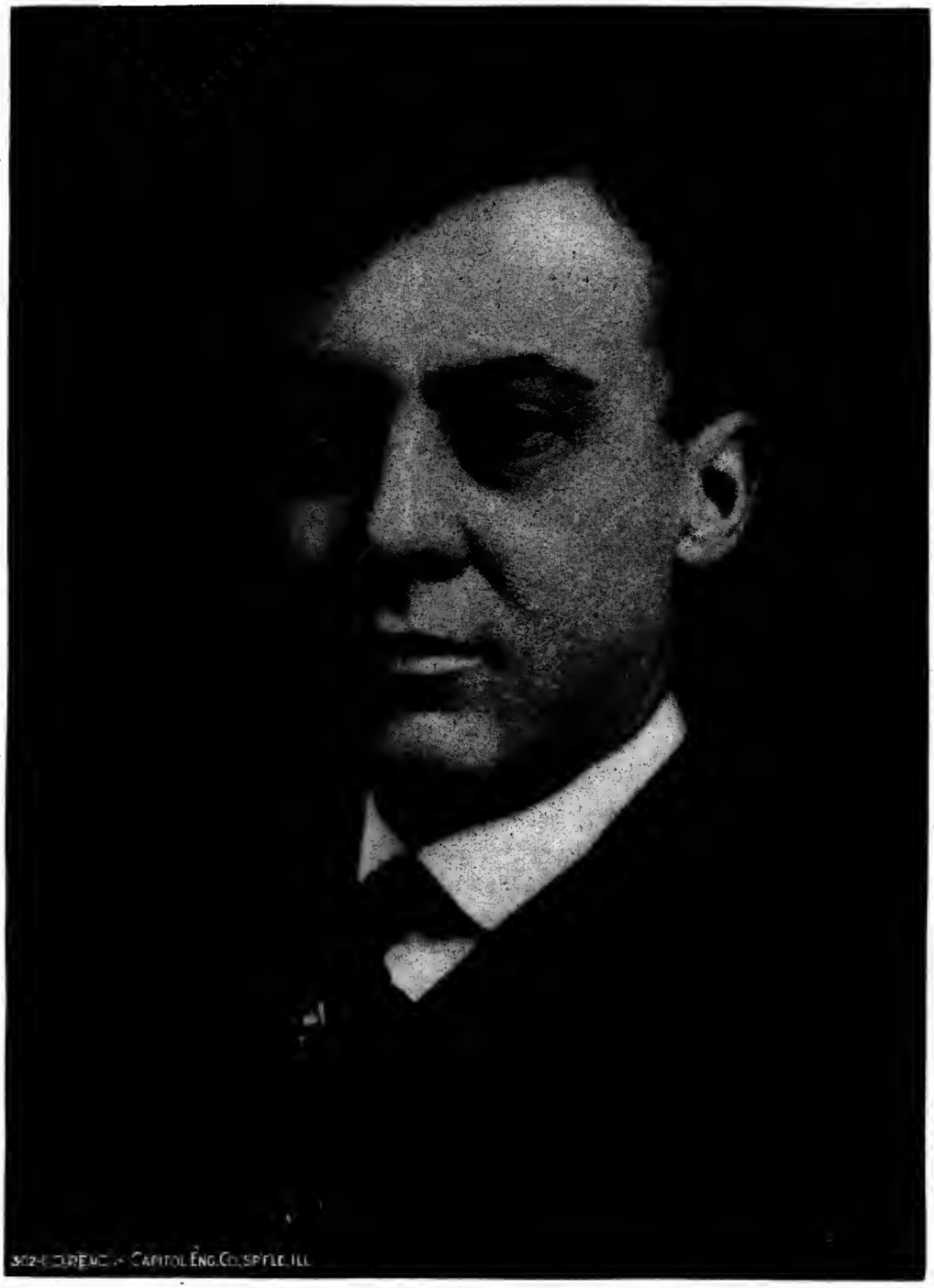
The past year has been one with "a good start but a poor finish." The first part of the season gave us a good flow of nectar and the progressive beekeeper secured a good crop. But due to the extreme drouth over the greater part of Illinois few colonies obtained enough fall honey to winter them. And if the beekeeper has not given them plenty of stores many colonies will die for the lack of food.

But it is to the future that most of us are looking with that hope of the better which so characterizes the beekeeping fraternity. What the future holds for us we cannot predict with any degree of certainty, but by certain acts of our own we may influence the future to a greater or less degree, according to the energy we may put into the enterprise. If we as an individual or a few individuals attempt to keep the interests of beekeeping before the public and the beekeepers who are indifferent to their own interests we are doomed to failure or disappointment. It is only by the cooperation of the entire beekeeping fraternity that we can ever hope to obtain the many things that are needed to make Illinois the equal of her sister states in beekeeping.

The organization of county associations is a step in the right direction, but as yet is to immature to give the results desired. In another year every county in the State will have its county association.

The early settlers of Illinois, recognizing the value of honey as a food brought a few colonies of bees with them when they left our eastern states to make their new home in this great State. From this small beginning a great industry was built and our people were supplied with nature's healthful food in abundance. Illinois made great advances producing more honey than could be consumed within its borders and continued to do so until 1889. At that time Illinois ranked as second in honey production and in the advancement of apiculture in the United States and her future possibilities seemed great.

Since that time there has been a steady decline in the industry until now only half the honey is produced that was produced in 1889, according to figures given us by the United States census. From second place the beekeeping industry has fallen to fifth among the states in number of colonies of bees, and only seventh in the amount of honey produced within its borders. Millions of pounds of its potential honey crop are ungathered and thousands of pounds of honey are imported from other states to supply our own demand.



DR. A. C. BAXTER,
President of the Illinois State Beekeepers' Association.

What has caused this depression in the beekeeping industry of our State? It is not lack of initiative on the part of beekeepers nor the lack of educators, although the educational facilities in the State for beekeeping are sadly behind other states surrounding Illinois. The chief factor in this depreciating of the beekeeping industry is due to the wide spread of a highly infectious disease of the honeybee colony known as foulbrood. This disease, brought in from other regions through the exchange of materials and from buying and selling colonies, early obtained a foothold in Illinois and has spread from apiary to apiary until it is now found everywhere in the State where bees are kept. Its prevalence prevents expansion on the part of the progressive beekeeper and wipes out his smaller neighbor, who does not recognize the difficulty or does not care to remedy it.

This condition is deplorable in view of the fact that the disease can be eradicated from the apiaries of the State by proper control measures. This has been done in other states. The cure lies in the prompt destruction of all combs of infected beehives and in forcing bees to build new ones. The infected material is burned up and destroyed.

The big beekeepers with 300 to 500 colonies may know how to fight foulbrood and may benefit by having it kill off all the small beekeepers around him, but even they are put to much expense to combat the disease, besides their bee property is less salable on account of the disease and soon goes to destruction from disease when deprived of skillful care on account of death of owner or other causes. One of the largest beekeepers in Illinois kept bees for forty years without seeing foul brood, but now has to combat it. Leaving their 500 to 600 colonies to the care of hired help for the last few years has caused them to lose 100 colonies from foulbrood the past season. A low estimate on just the bees and comb would be a loss of $700,000 to say nothing of the expense of cleaning up the remainder to safeguard their future.

Many people near our large cities keep bees as a sideline to their regular business, using their spare time to care for from fifty to one hundred colonies of bees, who in a good season receive from $1,200 to $1,600 from their honey crop sold at retail. Often men like this are overwhelmed and are put out of business of producing for good. Besides this their neglected bees infect those in surrounding territory.

Nearly all states have laws which provide for a state officer known as an inspector of apairies, who directs the work of disease eradication. Illinois has such a law, but has been held back by the fact that the inspector could not properly organize his department, because of lack of financial aid.

Illinois has within her borders 200,000 colonies of bees, worth according to United States census a million dollars. The honey produced each year, according to the Bureau of Markets, amounts to 35 pounds per colony or approximately 7 million pounds, which at the present wholesale market price of ten cents per pound is worth $700,000. The census figures give no adequate idea of the industry in the United States or in any state because only bees on farms and their production

are reported. The up to date beekeepers of the cities and towns who keep hundreds of colonies each are entirely left out as well as their product.

The report of our State bee inspector for the past year shows that only 9.067 colonies of bees were inspected and that of these over 14 per cent were diseased. Think of it! 14 per cent of the colonies of bees which were inspected in Illinois are not productive and need to be destroyed, and of those not inspected at least an equal percentage are diseased and remain as a menace to the honey crop of the beekeepers and further to diminish the total returns.

Our loss, therefore, through bee diseases at the least minimum is $140,000 in bees, dying or destroyed, and $100,000 in diminished amount of honey produced, besides the indirect losses of pollination curtailment of the industry.

The honey producing industry now bringing into the State one million dollars a year on the average, is in danger, adequate bee inspectors will ward off this danger and eventually cause a million or two more to be put into the industry and result in more millions in the annual return from the sale of honey and bees.

The State law for inspection seems to be all right with money enough to work with and Illinois should do as her neighboring states are doing. Four years ago Indiana came to the realization that something must be done or the bee industry of the State would be ruined. She therefore appropriated a maximum of $15,000 with a bee inspector on full time, in charge of the work. In four years her foulbrood loss has diminished from 25 per cent to two per cent and her honey has increased a million pounds. This represents a total value of honey and colonies saved to the state of at least $200,000 a year. It is probably close to a million dollars for the four year period.

The solution of the problem in Illinois is therefore obvious. Instead of an inspection system hampered through a lack of funds, the state should appropriate for beekeeping inspection $12,000 per annum, which is an amount more commensurate with the value of the industry to the commonwealth. This would allow for the appointment of an inspector under the Director of Agriculture, who could devote his full time to alleviating the conditions.

With Indiana giving $15,000, Michigan $10,700, Wisconsin $10,500 for apiary inspection, can the great State of Illinois afford to do less? Can she afford to have one of her basic agricultural industries faced with ruin? By united effort from all beekeepers there is no reason why Illinois should not lead in inspection work. Other states with a third of the resources of our State, with fewer beekeepers, have obtained the best in all things that make for better bees and better beekeepers. We should do the same and have Illinois in the front rank and second to none.

While beekeepers have improved as a class, and are becoming better, there is still room for great improvement, not so much in the handling of bees and the production of a good crop, but in the selling

of the crop. Beekeepers will plan for a year and work through the heat of the day to produce a crop of fine honey and then dispose of it in a few minutes. I find honey on our local markets poorly packed and ungraded selling at a price which could not have paid the producer the cost of production, while if the producer had followed a few simple grading rules, packed in new, clean cases, he would have produced honey at a profit instead of a loss. The same applies to extracted honey, new pails, full weight and well ripened honey will always command the top price. Be honest with yourself, as well as with the buying public. Do not attempt to undersell your neighbor, for by doing so you not only bring condemnation on yourself but the entire beekeeping fraternity. The unthinking public has long believed that honey is produced without labor or investment of time and money and such acts only confirm that belief.

MAURICE G. DADANT,
Secretary of the Illinois State Beekeepers' Association.

REPORT OF EXPENDITURE OF STATE FUNDS FOR STATE BEEKEEPERS' ASSOCIATION.

The fund allowed by the State for the Illinois State Beekeepers' Association amounts to $2,400 for the biennium or $1,200 for each year beginning with July 1, 1921. This is divided as follows: Salary, $600; office expense, $1,200; expenses of meeting, $600. The salaries are not to be paid to any officer of the State Association but are for outside work, such as stenography, etc.

Of this amount during the last eighteen months the following has been spent. Salaries, $210; office expense, $831; expense of meeting, $364. Practically all of the salaries are for stenographers for 1921 meetings. Office expense consists of necessary office expense besides about $500 spent for publication of the last annual report. Expense of meeting is payment of expenses of different speakers at the meeting together with payment of expenses of carrying on display and demonstration at the Illinois State Fair.

Statement shows balance in the State treasury of the State fund of approximately $1,100. This will be used up in office expenses, expense of the 1922 meeting and in getting out the next annual report.

All orders drawn on the State funds must be O. K.'d first by the Secretary of the State Association, then by the President of the State Association and finally by the Director of Finance of the State of Illinois. There is therefore a triple check on these expenditures.

Respectfully submitted,

M. G. DADANT,
Secretary Illinois State Beekeepers' Association.

REPORT OF THE SECRETARY OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR THE YEAR 1922.

Acting on the instructions of the association, the committee made effort to have formed as many local associations in the State as possible. There are now fifteen local associations in the State, nearly all of which are affiliated with the State Association.

During the year twenty-eight meetings were held, speakers being secured both in the State and outside the State as attractions for these meetings with as little expense as possible.

The total membership for the year is 523 beekeepers, representing 77 counties in the State.

The annual report was issued early in the summer, and all that were printed have been issued to paid up members. Your Secretary has issued the monthly news letter regularly during the year, a copy being sent each month to each member.

A conference was held at the University of Illinois in the effort to get a department of beekeeping there and also to get University authorities interested in the Miller Memorial library. Unfortunately, insufficient funds prevented the establishing of a complete department at the University, though it is hoped to effect it within another year. The Memorial library went to Wisconsin.

Cooperation has been effected with the State crop department at Springfield, and this department gives bee information now together with other agricultural information from time to time.

Under direction of the President a complete exhibit of bees and of actual extracting of honey and packing was given at the Illinois State Fair, attracting wide attention of the public. An extracting outfit was purchased from the State Association funds at a cost of $161.60.

Financial statement for the year is as follows:

On hand at beginning of year	$137.58	
Received from League subscriptions	120.75	
Received from memberships	282.80	
		$541.13
Membership in American H. P. League	$100.00	
Expenses of delegate	85.89	
Dr. Miller Memorial Fund	20.00	
State Fair Extracting Outfit	161.60	
Salary of Secretary	100.00	
		$467.49
Balance in Treasury		$ 73.64

M. G. DADANT, *Secretary.*

STATEMENT OF TREASURER OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION DECEMBER 1, 1921 TO DECEMBER 1, 1922.

Dr.

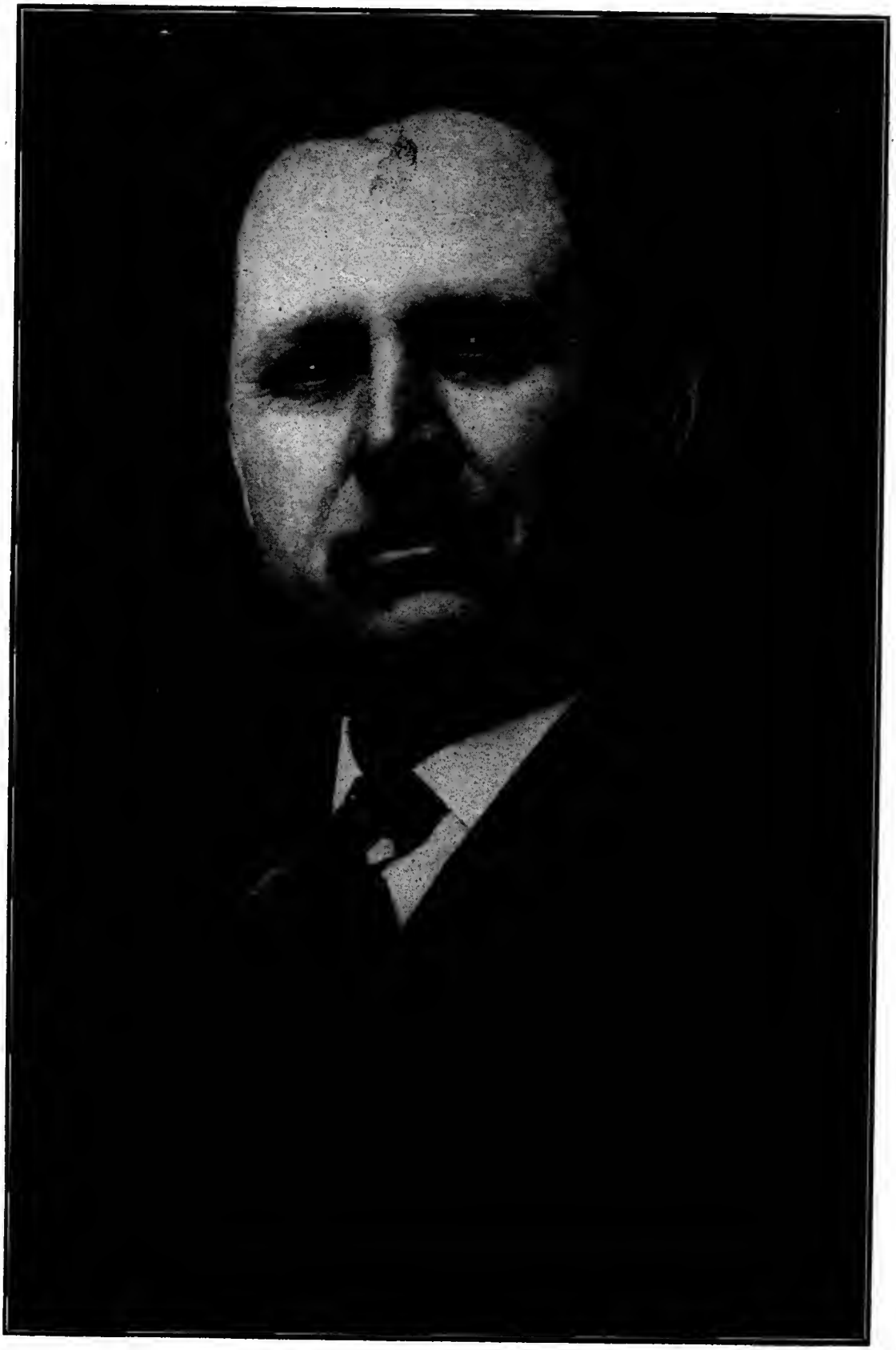
G. M. Withrow	$100.00
Dr. Miller Fund	20.00
American Honey Production League and C. H. Wiley expenses	185.89
A. I. Root Co.	161.60
M. G. Dadant, salary	100.00
Balance on hand	73.64
	$641.13

Cr.

Balance on hand	$130.08
December 16, deposited	107.50
December 20, deposited	21.75
January 11, 1922, deposited	9.55
January 30, deposited	41.40
March 7, deposited	166.75
April 3, deposited	45.10
July 7, deposited	53.50
November 1, deposited	65.50
	$641.13

Respectfully submitted,

GEO. SEASTREAM, *Treasurer.*



GEO. SEASTREAM,
Treasurer of the Illinois State Beekeepers' Association.

MINUTES OF CHICAGO-NORTHWESTERN CONVENTION.

The Chicago-Northwestern Beekeepers' Association held its 26th annual convention on December 4-5, 1922, in the Rose Room of the Great Northern Hotel at Chicago, Ill.

President G. H. Cale called the convention to order and delivered a short address, welcoming all to our convention, after which the President appointed the following committees:

Committee on Auditing the Secretary-Treasurer's Books, Mr. C. O. Yost, Mr. E. A. Weineke. Committee on Resolutions, C. O. Yost, E. S. Miller.

Mr. E. R. Root gave an interesting talk on a new treatment of American foulbrood.

Mr. Allen Latham explained how honey can be used to make an anti-freezing liquid for automobile radiators.

Mr. H. F. Wilson of American Honey Producers' League explained at some length the use of chloride solution in eradicating American foulbrood from combs, also stating that it was not entirely satisfactory and that a new solution was being prepared which is expected will eradicate the disease from the combs entirely. After which the convention adjourned to 1:30 p. m.

Afternoon Session.

Mr. E. S. Miller spoke on the organization, the development and activities of the Honey Producers' League.

Mr. H. F. Wilson addressed the members on organization of Honey Producers' League, why members should join individually and collectively and of the benefits derived from doing so. He also told how honey can be sold on a larger scale by advertising through the Honey Producers' League; also of the need of moral and financial support.

A very interesting talk on making honey candy was given by Mr. Allen Latham.

Mr. C. O. Yost gave an interesting talk on the necessity of organization and the benefits derived therefrom. He also told how foulbrood inspectors in the State of Indiana are assigned to various routes in such a way intended to make the inspection more effective. From what can be gleaned from the talk of Mr. C. O. Yost, Indiana is the healthiest bee state in the country.

Mr. Samuel Cushman talked on local organization and how he organized the Cook County Beekeepers' Association.

Mr. Allen Latham gave us his interesting experiences on things and devices he has found useful. He spoke of a hive stand made of concrete,

how to make it and its benefits, of supplies for the hive and their proper uses, of proper beespace in the hive, of getting rid of robber bees by killing same on frame of honey exposed to them, also by trapping robber bees by an ingeniously constructed trap to catch them. He also told how to take care of extra choice queen cells found in the apiary, also described little mating boxes for such cells. He described method of driving staples straight in end bars of frame. How nails may be coated with rosin. A quick way to make syrup for bee feed by pouring the same from one can to another. Of having extracting frames of one width all around.

Mr. E. R. Root kept the members interested with his talk on hives in which he favored the large hive. He also gave a very interesting history of hives at different periods, the movable frame, the proper bee space and where to put it.

Mr. Allen Latham again entertained and instructed the members in the business of selling honey at fairs, also making and selling honey sandwiches.

Mr. Cale also gave an interesting talk on selling honey.

Mr. Atkins of Lewis Co., gave an appreciative talk on prices of honey and the necessity of organization of the Honey Producers.

Mr. E. Winkler's absorbing topic was on Huban clover, the preparation of the soil, various ways of growing it and its benefits to man, after which the following resolutions were adopted.

Resolved, That the Chicago-Northwestern Beekeepers' Association hereby ask the Illinois State Beekeepers' Association at Springfield, Illinois, December 6th and 7th, 1922, to pass a resolution which shall be presented to members of the Illinois State Legislature to make laws and appropriate funds that will enable Illinois to carry out a system of inspection like that now proving so successful in the State of Indiana.

C. O. YOST,
E. S. MILLER,
Committee on Resolution.

Resolved, That the Chicago-Northwestern Beekeepers in convention assembled respectfully request the Illinois State Legislature to appropriate sufficient amount to adequately carry out a rational system of Bee Inspection in the State of Illinois.

C. O. YOST
E. S. MILLER,
Committee on Resolution.

WHEREAS, Our esteemed fellow member, Mr. J. C. Wheeler of Oak Park, Illinois, on June 26th last, passed from this life; therefore be it

Resolved, That we, the members of the Chicago-Northwestern Beekeepers' Association in convention assembled, extend to his family our heartfelt sympathy in their bereavement; be it further

Resolved, That a copy of this resolution be sent to his family and that the resolution be placed upon the minutes of this association.

C. O. YOST.
E. S. MILLER,
Committee on Resolution.

After which the convention adjourned.

Respectfully submitted,

J. FRANK HAAN,
Secretary-Treasurer Chicago-Northwestern Beekeepers' Association.

REPORT FROM THE STATE APIARY INSPECTOR FROM JULY 1, 1921 TO JULY 1, 1922.

(By A. L. Kildow, State Apiary Inspector.)

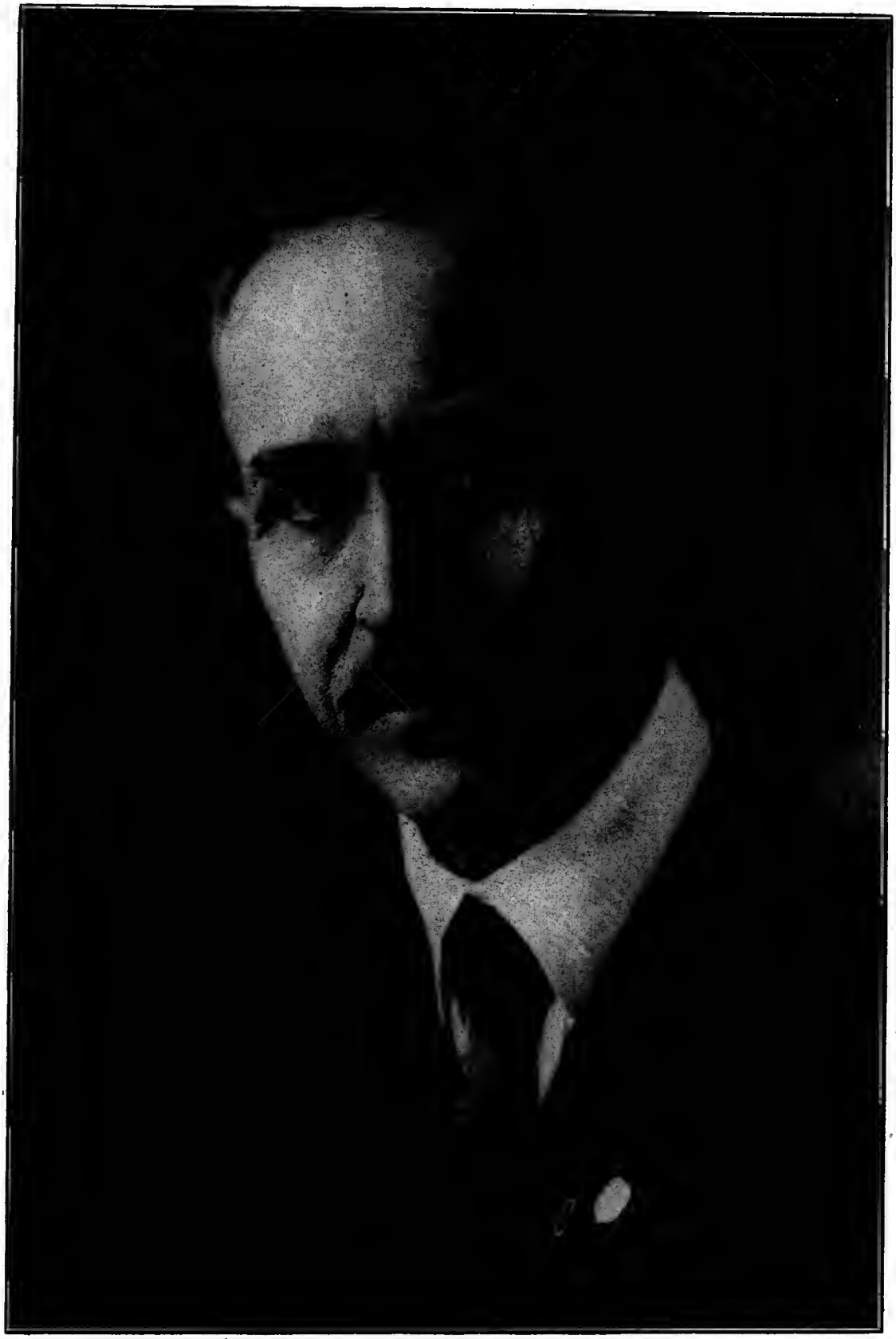
A comparison with conditions of past years, will show something of our work.

In the year 1911 the inspection work began in July and continued for three months. Two hundred and thirty apiaries were visited and 38 apiaries were found to have American foulbrood while 30 had European foulbrood. In this year 21 counties were visited and 19 had disease.

E. A. Welch apiary at Quincy. In reach of the Mississippi lowlands and fall blossoms.

In 1912 there were 667 apiaries visited and 72 apiaries were found to have American foulbrood and 216 to have European foulbrood.

In 1914 there were 783 apiaries visited with 143 having American foulbrood and 127 having European foulbrood. During this year 48 counties were visited and 40 found to have disease.



A. L. KILDOW,
State Inspector of Apiaries.

The past year, that is from July 1, 1921, to July 1, 1922 we inspected 418 apiaries, containing 9,067 colonies and found 89 apiaries to have American foulbrood and 32 to have European foulbrood.

Forty counties were visited and 26 were found to have disease. The greatest amount of disease was found in and around the larger cities. For instance 22 apiaries in Cook County were found to have American foulbrood.

One inspector found that out of 14 diseased apiaries only 3 showed any trace of disease, when these apiaries were re-visited thus showing an improvement in how to treat disease and how to manage the bees. Another said, that foulbrood was badly scattered in his territory, but at the present they had it under control, as only 2 cases now existed, and that these would be taken care of in early spring.

With few exceptions the inspection work has met with exceedingly cordial treatment and cooperation. We were short of help during this year, but had an increase of inspectors in July, so we are much better equipped.

Besides this work, much was done in an educational way. Field meets and association conventions were well attended and the instruction work speaks for itself in the increase of our industry.

One of our inspectors explains it in the following manner: "As a matter of further information for the year 1921-22 I beg to advise that Jackson, Pope, Marion and Williamson Counties are becoming much interested in bee culture since the associations were organized.

"Many inquiries about modern equipment and use of same and especially so about the movable frames and use of full foundation, in fact all the devices used at the present in beekeeping. They want a full explanation and quickly grasp the use of same.

"Many inquiries for bees from interested people desiring to make a start in bee culture.

"These facts alone demonstrate what county associations will do, once the people can be shown where they can turn loss into profit on money invested, they are quick to grasp the opportunity and advance further.

In January, 1921 at your request, I became active in Southern Illinois and found many things to contend with, scarcely any modern equipment to be found with absolutely no care for the bees, hence no financial return and all discouraged.

"Now we have a good live association with some developing into real beekeepers, one of whom I know stated that he sold the surplus honey from two of his colonies for $70 gross this year. Two years ago I shook his bees for American foulbrood with no return of disease since. This shows that American foulbrood can be stamped out effectually if work is done carefully."

REPORT FROM JULY 1, 1921, TO JULY 1, 1922.

Date.	Number apiaries visited.	Number colonies.	Number having A. F. B.	Number having E. F. B.	Per diem.	Office.	Travel.
1921							
July	105	1,891	27	9	$259 00		$97 47
August	58	1,681	9	5	236 00	$2 00	96 92
September	98	2,114	16	5	259 00	2 00	98 27
October	12	299	1	1	51 00		8 60
November							
December, State Convention					21 00	2 00	13 31
1922							
January, Cook County Bee Meeting					21 00	2 00	9 32
February, Convention organized at Danville					33 00	3 75	
March, Coles County Bee Meeting	1	5			56 00	2 00	34 12
April	6	485	1	1	81 00		40 58
May	73	1,535	23	6	230 00	2 50	88 31
June	65	1,057			304 00	2 00 13 50	95 03
Total	418	9,067	89	32	$1,551 00	$31 75	$581 93

REPORTS OF COUNTY INSPECTORS.

The Secretary of the State Association has asked all county inspectors to make report of conditions in their individual counties and surrounding so as to give the members of this association an idea of just what sections of the State have been inspected and how such inspection has been progressing. Reports of the deputy inspectors follow:

Macon County.

Most of the calls here were by request. The heaviest outbreak is in and around Decatur, which we believe is contracted by honey being shipped in here from other parts and the containers carelessly thrown out and taken to the dump. I further find that within a radius of a mile of the dumps we have reoccurrence of the disease in the same apiary, although through the country there are scattering cases. I have visited about 100 apiaries since the 1st of last July and examined about 900 colonies of bees, have most of it under control. I think there are about 5 different apiaries that this malady will show up in in the spring.

At Pierson, Ill., in one apiary of 64 colonies I was able to save only four colonies. This was spread by dividing and colonies were very weak. At Augusta I was able to save three colonies out of 26 colonies. At Sullivan I saved 22 out of 23 colonies. In most places we have destroyed all that looked hopeless.

A year ago last July there were about 20 per cent of bees affected by foulbrood and this fall I do not think there will be more than about 2 per cent. I know this can be wiped out of existence by constant work and then can be kept down by education.

Wm. H. Snyder, Decatur, Ill.

Sangamon County.

European foulbrood is all over Sangamon County. American foulbrood is in the east and south part of Sangamon County. European foulbrood is found more or less in most of the apiaries I have inspected due to the carelessness of the keeper.

Most of the beekeepers are the don't care kind, let the bees alone except once in a while, take off or put on a super, or hive a new swarm in a new hive if their bees swarm. I have some few that are very progressive and are trying to learn and are succeeding to a great extent.

In the northeast part of the county they are very active since I visited them. Menard County has very poor beemen. European foulbrood very thick there. Some few are taking hold and are helping me straighten things out up there. Cass County has both progressive and careless beekeepers and lots of both American foulbrood and European foulbrood along the Illinois river.

Harry L. King, Springfield, Ill.

Wabash County.

I received my commission as inspector late in July so did not get over the entire county.

I visited 33 beekeepers and inspected 417 colonies of bees. Of this number 156 were standard frame hives with straight combs, 100 ordinary box hives and 161 in home made frame hives but little better than box hives. None of these were diseased.

This county is separated from Indiana by the Wabash River.

I visited one beekeeper who lives about 2 miles north of me and just across the river, he had 3 colonies left out of 8 that went through the winter of 1921. The five were full of American foulbrood. One thing that appeared rather strange to me was that the five dead colonies were not bothered by moth worms.

I have 85 colonies of my own. I treated 3 for American foulbrood.

Robert Watt, Mt. Carmel, Ill.

Christian County.

The season for inspection work was almost over when I qualified for the position but I was fairly well acquainted with conditions of the larger part of the county before taking up the inspection work. We have brood diseases from east to west, from north to south boundary lines of Christian County.

In some small yards I found American foulbrood in such a stage that it was necessary to burn part of the colonies. We have over 1,200 colonies of bees in this county.

Number of Apiaries examined	12
Number of Colonies American foulbrood	21
Number of Colonies European foulbrood	5
Number of Colonies clean	211
Total number examined by me	237

Frank Bishop, Taylorville, Ill.

Douglas County and Surrounding.

During the season of 1922 I examined 1,154 colonies of bees, in 63 apiaries. Of this number 44 colonies in 9 apiaries were found to be diseased, 3 with European and 41 with American foulbrood. The work was done in six counties, Douglas, Edgar, Vermilion, Coles, Clark and Crawford. American foulbrood was found at Tuscola, Fairmount, Paris and Hutsonville. All colonies with American foulbrood were carefully treated or destroyed. The European has ceased to be very serious in this part of the State.

The worst situation in regard to disease are along the Indiana State line, where it is impossible to keep the territory clean, on account of disease being carried back and forth across the line, by the moving of bees or the flight of robbers.

C. F. Bender, Newman, Ill.

Adams County.

I made one inspection by order at Pleasant Hill, Ill., and was to go to Jerseyville, Ill., but did not get through. All other inspections were in south Quincy and South Twenty-fourth and Twelfth Streets, and in bottom south of Quincy to Marblehead.

I found several old homemade hives and boxes in use. I found most beekeepers anxious for the inspections who gave me much assistance and where I found foulbrood they got busy and cleaned up. I had trouble with just one man on South Twenty-fourth Street, Quincy. I will handle him in nice shape in the early spring. I learn I will find more foulbrood in the north part of Quincy and a great many in the hands of farmers who are as a rule neglectful. I have had a great success in fighting foulblood and have very small carry over and hope to make a clean spot around here next year.

Colonies inspected	409
Apiaries inspected	33
Apiaries inspected (found foulbrood)	14
Colonies inspected (found foulbrood, 10 European, 68 American	78

E. H. Rittler, Quincy, Ill.

Jackson County.

During the year July 1, 1921, to June 30, 1922 I visited some 60 different yards, containing some 619 colonies of which eleven yards were affected all with American foulbrood. Some territory I visited in 1921 and again in 1922 showed clean but it was where I did the work myself.

I was well received everywhere excepting one party in Jackson County, who was arrested, fined and bees burned. This party was giving us lots of trouble as he was selling equipment and drawn combs with scales in cells. I anticipate less trouble in this locality now that the cause has been located and taken care of.

J. R. Wooldridge, Chicago, Ill.

Henry County.

As I was not appointed inspector of apiaries until in August, 1922 it was too late to do very much inspection work in this part of the State last fall, but owing to the late fall we had I did do quite a bit of work in that line in some parts of Henry County.

I find the northern part of this county is more infected with disease than the southern part, but the northern part has more apiaries than the southern.

I inspected 55 apiaries and found that 28 of these had disease of which 20 apiaries had European foulbrood and 7 had American foulbrood, and 1 apiary had both the American and European.

These 55 apiaries contained 538 colonies of bees of which I examined 199 colonies, out of these 199 colonies, 91 were diseased or about 16 per cent of the bees were infected with some kind of disease.

I also found that almost 25 per cent of the bees were in box hives or in hives with frames, without any foundation.

Out of the 55 apiaries visited, 4 were in Rock Island County, of which 1 had European and 1 had American foulbrood.

One apiary was visited in Whiteside County which had American and in very bad shape. Another apiary was visited in Knox County, it had European foulbrood.

There are still 13 townships in this county that I have not worked a bit, but will go after them in the spring as soon as work can be done in the line of inspection.

I think European foulbrood will soon be stamped out as pure Italians are introduced all over the county to replace the blacks, but I think it will take longer to rid ourselves of the American. However, if enough money will be appropriated to do a thorough inspection, there will be very little disease in this county at the end of 1923.

Elmer Kommer, Woodhull, Ill.

Hancock County.

Herewith report of inspection work:

Number of Apairies visited	56
Number of Colonies inspected	913
Number of Colonies with American Foulbrood and treated	54
Number of Colonies with European Foulbrood	10
Number of Box Hives	14

I began inspection June 17, and worked at odd intervals to August 15, and covered the west half of Hancock County, and the north part of Adams. I found disease prevalent in the west part of county south to Ursa beginning one mile north of Hamilton and extending east to Basco and south to Lima. The north part of county consisting of the country around Nauvoo, Niota, Colusa, Burnside, Powelton and Elvaston, is entirely free of disease. All colonies found with American Foulbrood were shaken and equipment either burned or sterilized. A number of places were found where an apiary of 10 or 12 colonies had

died of American Foulbrood and old hives were still sitting on their old stand and a few stray bees working robbing out what infected honey that was left. In these cases equipment was burned in a pit, and pit filled up. There is urgent need for the south half of the county to be checked over the first thing this spring.

G. R. WATT, Hamilton, Ill.

No report from Cook County.

HOW HUBAM CLOVER INCREASED MY HONEY CROP.

(By Edw. A. Winkler, Joliet, Ill.)

Along in the year 1920 I received a free sample of Hubam clover seed from the Iowa station, and after harvesting several pounds of it that year, decided I would plant quite an acreage in 1921, so I bought some more seed from Henry Fields, and after I was through planting I found I had 43 acres. I had limed the ground well and, although I was late in planting it, I harvested a fine lot of seed.

I paid $30 an acre for the land I grew my Hubam on and $10 per pound for the seed, and hired nearly all the work done as I am no farmer but a beekeeper with about 500 colonies. When I planted my clover I thought I was going to grow it as a side line with my bees, but when cultivation time came, and then hand weeding became necessary with the managing of many boys, I soon found that my bees were the side line and that I was working overtime to prevent a total loss in both lines.

Well, when I had my seed all in bags and all expenses added up I found that my total investment was over $3,000, not figuring my own time. I was not discouraged, for I had over 2,700 gallons of honey and I believe the finest lot of Hubam seed in the State.

I sold about 1,000 pounds of my seed, but not many farmers were buying seed at $2 per pound so, long before the seed selling season opened I decided I was through selling Hubam seed. I had decided on a plan where I could invest my seed better than the money it would bring. I had harvested not a pound of honey from my 43 acres, but was sure that if the atmospheric conditions were right, Hubam would yield honey, and lots of it, for I had read of others harvesting Hubam honey.

I drew up contracts and advertised once in the local paper that I would furnish the seed, one-half the limestone, test the soil (in which I used the Potassium Cyanide test), furnish bees to pollinate the bloom and under my instructions the farmer was to prepare the soil, plant the seed broadcast, 10 pounds per acre, and hull the seed crop, the seed to be divided equally between us. I also planted some in all kinds of grain. Inside of three weeks my seed was all spoken for.

In this way I had 438 acres planted by farmers, from 10 acres up to 70 acres each.

Nearly all the fields planted in grain early in the spring had the Hubam just as high as the grain when the grain was cut. Those straw piles make mighty good feeding, for the stock eats it readily, while the grain yields were just as high as fields that had no Hubam in. Now,

you know the chinch bug does not bother sweet clover. It's hard to find a chinch bug in a field of sweet clover, and I believe that Hubam in grain fields will, to a great extent, eliminate this pest.

We are cutting Hubam here now that was seeded in winter wheat, oats, spring wheat and winter rye.

All of those stands in grain were planted 5 pounds per acre and will yield from 5 to 6 bushels of seed per acre, while the fields of Hubam planted alone will run from 8 to 10 bushels of seed per acre. One field planted in oats will average at least 6 bushels per acre.

The spring started in so wet that farmers could not plant until almost the first of May, and then after planting it refused to rain any more.

The bees started to work on alsike about June 5, and by July 4 I had 800 gallons of fine clover honey in cans. Wild biennial followed in the heels of alsike and before that was through my Hubam was white with bloom, and I never saw bees carry honey so fast as they did all through August, which is usually a droughty month here, and was with two of my outyards this year that couldn't reach the Hubam fields.

We had a frost September 26 and today, the 28th, although the fields are ripe with seed and cutting is progressing rapidly, there is an underbloom down in the Hubam that the bees are working heavily on.

I am usually about to pack my bees for winter by this time, but the supers are still on the hives and bees working just like in July, and if I shake the bees off the unsealed combs the honey splashes out like water, so I must leave the supers on until the bees stop working, even if it is Christmas.

I extracted six times at all yards where Hubam was growing, and there will still be a clean-up. Many of my hives have already produced 400 pounds each and some of those hives have over 50 pounds on now, and it seems that they will keep on working until it gets good and cold, for the Hubam fields that were cut over two weeks ago are beginning to get whitish again, and with a late fall like we had last year—O, shucks, why be so hoggish? Hasn't the good Lord been ever so generous this year, and anyhow as soon as the bundles are hulled the farmers are going to fall plow it for corn or disc it up good and put in their winter grain.

We have organized the Will County Hubam Seed Producers' Association. Altogether, we have approximately 1,000 acres. The object of this association is to sell at a uniform price, clean, certified, scarified Hubam seed.

I will not stop until Hubam is growing on nearly every farm in Will County. I don't know how much seed I will sell, but I know I will not sell all of it, for I am going to contract most of my seed out again next year in small grain, and Will County will flow with honey from May till October, and when I look at the hundreds of cases of fine extracted honey piled up 7 cases high in long tiers and in every available nook and corner until it is almost impossible to take stock, I feel that it is the best investment I can make.

Hail to Hubam clover, for it is more than a "godsend," as our sage, A. I. Root, wrote: "In time, when the seed is more plentiful, we will see great fields of it plowed under, but the right time to fall plow Hubam under is when the stocks are full of green seeds just as the white bloom is blasting, and that will be another 'godsend' to the bee-keeper."

With fields of Hubam clover all about us we get no amber fall honeys; although there is a slight blend, the honey is very light and Hubam honey is decidedly different than biennial white sweet clover honey, which has a greenish color. Hubam is white to light amber and tastes very much like white clover or alsike.

BEEKEEPERS MUST ORGANIZE.

(By J. R. Wooldridge, Chicago, Ill.)

Beekeepers must organize! How can this best be done? Below are some suggestions along these lines:

1. We have no financial means at our command to do with.

2. This means we must have more individual activity of each beekeeper within the State in securing new members for local associations, which must affiliate with State Association, which will bring our interests before our State officers with such force they will give more generously.

3. Now, how can this be done? This is a staggering question to us all, but must be done. Then, why not place ourselves in the hands of our Worthy President and Secretary, and let them tell us what they want done in every nook and corner within the State. We should be obedient to their instructions and report what effort we have put forth and what we have accomplished. By this means our President and Secretary will become familiar with all conditions within the State and they have the intelligence to meet every obstacle placed before them. There are too many of us on the stool of "do-nothing" at the present time. We must get down and go to work and make this association a success, regardless of the effort it costs.

4. It is not my intention to speak harshly about anyone present or absent, or to attempt to dictate to anyone, but it does seem that our five Vice Presidents are not active enough—at least I have not heard of anything they have done, although I may be incorrectly informed. Perhaps it would be best to have each one present tell us all of the good work he has done so that we may rejoice with him. I would further suggest that our President make it plain to all present before nominations are made that whosoever accepts the nomination for any office of the association must be active to the needs of our association, and be willing, yes, agree to act on the suggestions of our Secretary; do the work outlined, and report the results promptly to the Secretary.

By this means we will get a working force that will make the State sit up and take notice. The association has an abundance of brains, but they are not working. We need their activity. Now won't you help us?

5. What can be done about legislation? We are too weak in numbers at present to accomplish anything, although we have the nerve to ask, we have not the strength to support. We are familiar with the ways of a politician. He wants the votes which we are lacking at present, but let's go after a larger appropriation than ever, hoping to succeed.

6. Why not have a law enacted requiring every beekeeper within the State, having one colony or more, to pay a yearly license to the State of $1.00 and give to the State 25 per cent to collect said license—the balance to be turned over as an appropriation for bee culture, a portion to go to the State Association for expense money spent along educational lines.

7. It has been estimated there are some 27,000 would be beekeepers within the State—a full collection would mean $27,000.00 in funds. If we receive three-fourths of this amount it would be much more than we can hope for in many years to come from a straight appropriation for bee culture. Besides the beeman has helped himself by having the State tell him what to do. The State has spent nothing and is being paid liberally for what they do, and it is not hard on the beekeeper.

8. I hear some one saying it would drive all the little beekeepers out of business. He has the privilege of quitting or increasing. I have seen cases where they paid $1.00 per year cheerfully for a dog that would neither bark nor bite. I believe our losses would be nil, and those who left us for this cause we will be better without. They have no interest, and are dangerous to their neighbors.

I respectfully submit the above for your consideration.

BEES AND HORTICULTURE.

(By H. F. Wilson, Madison, Wis.)

Science tells us that all forms of plant and animal life are to a more or less degree dependent upon other plants or animals for their existence. Just why some of the forms of life now in existence should be allowed to survive may be hard to understand, but each succeeding year brings new discoveries which make known to us some of the things we do not now see clearly.

The interrelations between insects and plants are of prime economic importance to the horticulturist and farmer. This is true because of the part insects play in carrying pollen from one plant to another, thereby providing cross fertilization which is so often essential to the production of strong, healthy plants.

Our fruit growers should take time to study the habits of insects about the blossoms in the spring, especially the honey bee. If they have a proper understanding of how plants grow and seeds and fruit are formed, it will only need a few observations to show what bees and other insects are doing for us.

Having the plants properly fertilized is just as much a part of plant growing as any other operation, and many fruit growers through actual experience have found this to be true.

Why is it that plants need outside help, do they not have the power of fertilization in themselves? Yes, but let me explain: In plants as well as animals there must be male and female elements. Animals are able to move about and complete the sex acts by themselves. Plants, being unable to move about, must depend upon the whims of nature for their transfer. Nature in some cases has combined the male (stamens) and female (pistil) organs in the same flower, although this does not mean that all such flowers can fertilize themselves. In other plants the female and male flowers are entirely separate from one another and depend upon the wind to blow grains of pollen from the stamens of the male flowers to the pistil of the female flowers. As with animals, cross fertilization is necessary in plants, and nature has so arranged its scheme that very few blossoms are actually fertilized within themselves. Cross pollination develops better fruits of all kinds.

In this scheme nature has provided plants with various colored flowers and nectar-secreting organs to attract bees and other insects at that particular time when the production of seed is to begin.

The petals of the flower are perhaps useful in drawing the insect near. The nectar at the base of the flower entices it deep down into the corolla, thereby causing the insect to come in contact with the pollen;

some of the pollen clings to the body of the bee and is carried on to the next flower.

The honey bee does not visit flowers to cause pollination but rather to gather the nectar and pollen as food for itself and its young. The plant provides the bee with food for services rendered.

Mr. W. J. Beal in 1868 wrote as follows: "Bees are willing agents here as in other instances, lighting first on the stigma of the older flowers which are further down the stems, and then passing up to others which are younger. Besides collecting nectar at the bottom of the flower, they collect the pollen by scraping the style upon each side with their legs and when calling at the next flower, first striking the exposed stigma, leaving a few little morsels as tribute for the bountiful supply."

This action of the bee, in which it unconsciously causes the fertilization of the flower is Nature's agent for bringing about cross-fertilization.

Bees Insure Crops. Many instances have been recorded showing the value of bees for farm, garden and orchard and experiments carried on by well qualified investigators show quite conclusively that bees are a necessary adjunct to successful farming and orcharding.

In the province of Ontario, Canada, where large areas of alsike clover is grown for seed production, the farmers are glad to provide space free of charge for beekeepers to set out their apiaries. In nearly every large green house where cucumbers are grown bees are used to pollinate the flowers.

In the State of Washington a few years ago orchardists were renting colonies of bees at five dollars per colony to fertilize their apple crop. Every now and then very definite examples of the need of bees in pollination are shown. Mr. L. D. Stilson of Nebraska notes that in 1893 the apple trees in his orchard bloomed abundantly and the fruit set in great profusion. When the apples were about one-half to three-fourths of an inch in size they began to drop. An examination showed that very few seeds had been formed. Mr. Stilson credits the trouble to the fact that heavy rains occurred during the blooming period which washed the flowers clean of pollen. In Mr. Stilson's orchard, where he had some bees, he noticed that of the fruit formed, most of it was on trees in the immediate vicinity of the apiary or in line of flight of the bees on sunny days following rain. With cherries he had had fourteen consecutive crops, while others without bees had missed three to five crops. Mr. Stilson also mentions that E. Whitcomb of Friend, Nebraska, in 1893 produced 300 bushels of cherries, while orchards equally as good, but out of the line of flight of the bees produced none.

Mr. A. H. Kendrickson carried on some work for the California Experiment Station in 1915, 1916, 1917, in which he placed tents over trees and placed a colony of bees under several of the tents, while the others had no bees. Observations were made on 50,000 plum and prune blossoms in 1915, on 87,000 in 1916. The trees under tents with bees set about 19 per cent while the normal set in the field was a little less than 4 per cent. Mr. Hendrickson concludes that "both the

French and Imperial prunes may be aided in setting fruit by the use of bees in the orchard during the blossoming period, provided the trees are in a normal healthy condition. The absence of bees in the orchard may mean a low percentage of set with both of these varieties."

Prof. N. B. Waite, writing in one of the government bulletins on pollination of the pear, mentions that "the common honey bee is the most regular important and abundant visitor and probably does more good than any other species. Pears require cross pollination, being partially or wholly incapable of setting fruit when limited to their own pollen."

Just how much good bees do in fertilizing cherries in Wisconsin is an undecided question, but on the Pacific coast bees are deemed necessary and there are printed records which indicate that some species cannot be grown without the aid of bees.

Dr. Gates, formerly with the bee department of the Massachusetts Agricultural College, reports that several growers in that state continually used bees to insure fertilization of melons. Greenhouse men who grow cucumbers are entirely dependent upon bees for fertilization of the blossoms as hand pollination is entirely too laborious. Dr. Gates reports that one grower was known in Massachusetts who used upwards of eighty colonies of bees each year in cucumber greenhouses.

There are many other examples which might be given, but these are sufficient to show the value of bees in horticulture.

Injury to fruit by bees. Uninformed persons who see bees feeding on punctures in fruit usually come to an immediate conclusion that the bees are responsible for the injury, but such is not the case. It is not possible for bees to puncture the skin of fruit, because their mouth parts are not sufficiently sharp. However, once the skin of a fruit is broken, the bees gather around the wound to suck up the juices which are exposed.

If you will carefully examine grapes or other fruit upon which the bees are feeding, you will usually be able to find a discolored area, showing where the skin has decayed following injury by some other insect, or perhaps a fungus growth.

ORGANIZATION.

(By C. O. Yost, Indianapolis, Ind.)

That there is unlimited power in organization, is a fact that is recognized by all thinking men and women pursuing the various vocations of the human race.

A brief study of a panoramic history of the world, would afford us some interesting data relative to power, success, and failure of organization with its many forms and purposes which were good, bad, selfish, weak, and strong in elements of control.

Organization with its attendant powers of good and evil, success or failure, strikes us as a tremendous factor in the making of the world's history, when we take a survey through earliest kingdoms and nomadic tribes, wars of religion, or crusades, wars of conquest, organized for the purpose of giving rulers more power, glory, wealth or the peoples' happiness.

The building of great monarchies, either absolute or limited, the mighty Roman Empire, the mighty machine of Alexander, or Caesar, the Teutonic wave, the stormy periods incident to the building of the British Empire, the early discovery of new lands with accompanying purposes of their settlement, formation of republics, and empires, of many factions and destinies, nations with military organizations of great magnitude, the creation and destruction of powerful navies, finally our own United States of America, the grandest and most powerful government ever organized, all show how much depends on efficient organization.

We may by some study of factors controlling these myriads of organizations, form a clear conception of the direct or remote causes which caused them to rise or fall, conquer or be conquered, develop and become a world power, or fall back into obscurity.

Whatever transpired during this great world drama, most assuredly depended upon the purpose, power and efficiency of the organization relative to the event.

In my mind there are three kinds of organizations, good, bad and harmless, and each is dependent upon two elements for its progress. These elements are first the purpose, and second the personnel of officials in control.

A beekeepers' association is not in principle unlike other thousands of organizations, which play a prominent part in the industrial world of today; banking institutions, railway and telegraph corporations, religious and educational institutions, secret orders, industrial unions, and scores of others relative to the mercantile or manufacturing industries.

We are all more or less familiar with the life history of these combines or organizations. Some have prospered, others failed and were reorganized, some have passed into oblivion to be replaced by new ones later. I believe that every intelligent man and woman can readily apprehend the fact that the cause of failure or success of these organizations may be traced to one or both of the elements mentioned above (purpose and personnel). It would first seem unnecessary to mention the good, bad and harmless class of organizations, but I am firmly of the opinion that our careful consideration of them will enable us to gain a comprehensive idea of their most inner activities, their purpose and control, their growth and the causes of their failure.

A bad organization is one whose purpose is set up in a misleading manner and rather than proving a source of pleasure and profit to its followers, leads more or less to their downfall and misfortune.

Such an organization, while it may have a very bright colored purpose on paper, is really at heart built for the benefits of the personnel in control. Such systems as these are often found in political circles, also in monarchies and empires.

The German Empire consisted of a powerful military organization. The purpose of this Empire was such that the subjects of same were marvels of loyalty, but we know how badly they were deceived and how heavily misfortune fell upon them.

The Russian Monarchy reigned with a purpose just as deceiving to its humble uneducated peasants. In these cases the personnel seeking power and glory came to grief the same as the deceived followers.

A harmless organization is simply one whose purpose is merely an innocent dream of beautiful theories, and whose personnel is much addicted to the discussion of theories and ideals of a useless, harmless and unpractical nature.

Good organization is one in whose purpose we will find embodied such fundamentals as are conductive to the happiness, prosperity and cooperative contentment of its membership, a purpose with an attainable ideal, built solely along legitimate and honest lines, a purpose that within itself will create a desire in intelligent men and women to become a part of the affiliation, a purpose that will relieve the many needs of its prospective membership.

The beekeepers certainly have many needs, and I do not believe that the followers of any other vocation are more willing or anxious to form an impartial, progressive, protective combination than they.

It occurs to me that there are three vital environments that are of special concern to the beekeepers of the present; they are disease, market and educational environments. Either one of these environments is a large subject within itself, and can only be listed here as one of the important fundamentals relative to progressive organization.

After having established a fixed purpose for the organization we must next look at the personnel in control. It does not matter how sincere, commendable, or applicable the object or purpose of an organization may be, or how faithful and true the assisting factors may be unless the control is made up of officials capable of untiring leadership

that will ever keep in view the real interest of every supporting factor constituting the organization, the efficiency of the real purpose will be greatly lowered even to the dangerous point of much failing in interest and probable desertion by the membership.

The membership or supporting factors are the organizations' embodiment of life, and there can be no surer sign of its decay than their discontentment and desertion.

In order that the purpose or ideal set forth in creating an organization may not become afflicted with degeneracy, but instead will maintain a steady development along progressive and attractive lines, it is essential that every factor be sincere and of sufficient bigness, strength and energy to fulfill destiny in a manner as required for the continued upbuilding of the organization.

The Indiana State Beekeepers' Organization was created ten or twelve years ago. Its constitution was so constructed as to assure the membership of a progressive beneficial association; its splendid achievements are well known to all who were acquainted with its activities—through its influence the first bee laws of Indiana were enacted, and the splendid results of the application of the bee laws have proven that this one act was the greatest achievement of the organization. Three years ago the organization was reorganized and some changes made in the constitution—the purpose being to place the State Organization on the highest possible plane. It seems that every factor of the machine functioned perfectly, for there has been a steady and healthy growth in membership and influence. To my knowledge there has never been any friction or faction among the mass of members, and our conventions have all passed along in perfect harmony. We all should feel a thrill of pride when we consider that our State Organization is second to none in the United States.

EX-SERVICE MEN IN BEEKEEPING.

(By J. J. Gilcrist, Peoria, Ill.)

The United States Veterans' Bureau was instituted by act of Congress in order to consolidate under one head all government agencies that dealt with the after-war problems of ex-service men and women. The Bureau thus created is charged with the responsibility of carrying on the war time insurance, of providing vocational training for the disabled, and finding suitable employment for them after their rehabilitation.

When we pause to consider that among our ex-service people will be found practically every nationality, every creed, every race or color, great numbers of major and minor operations, the Tubercular, Neuropsychiatric or mental cases, blind, deaf or speech defects, and an educational range from illiterate to post-graduate, it must be conceded that our government has undertaken a tremendous and far-reaching task. Although the Bureau carrying on this big educational and industrial proposition is a national agency, its earnest endeavor is to bring into each phrase of the work, the humanizing influence of sympathetic and personal interest.

Each and every war veteran who believes that he has a disability incurred, aggravated, or traceable to service in the Army, Navy, or Marine Corps is urged to file an application for compensation and training. If, after medical examination, he is found to be suffering from a 10 per cent or greater disability, which vocationally handicaps him, he is entitled to a course in vocational training at the expense of the government, if such training is desired and feasible.

Those men who are entitled to training only, are allowed tuition and books. Those who are burdened with a vocational handicap, are allowed not only tuition and books; but also maintenance allowance for themselves and dependents.

The law requires that a course of training be prescribed, that the claimant be offered the prescribed course, and if advantage is not taken of the opportunity in a year, the privilege is forfeited. Every institution used by the government in its training program, is investigated and required to operate in conformity with the Bureau's training policies. Placement training, or training on the job, has been found the best form of training for a great many vocations. The Bureau enters into an agreement with a shop, mill, factory, garage, or any industrial concern, whereby the trainee is given instruction in his chosen line of work. While thus employed, he is given the same allowances he would receive were he attending an institution.

After the man's training has been completed, and there is sufficient evidence that the trainee possesses the requisite ability to carry on in employment, he is considered rehabilitated. It then becomes the duty of the employment service to place the man in suitable and gainful employment in the objective for which he has been trained. To do this successfully, requires the hearty cooperation of the business and industrial worlds, which have responded most generously and are absorbing into their activities, men who have been trained in all lines of endeavor, from auto mechanic to embalmer, from watchmaker to school teacher. Even at this point, the men are not dropped from the records, but are closely supervised for four months to make sure of their ability to carry on.

Many ambitious trainees have gone into business in a small way for themselves, or have acquired small farms where they carry on truck farming, chicken raising and bee culture.

The course in bee culture is given principally at the Michigan Agricultural College, East Lansing, Michigan, and usually in conjunction with poultry raising. One of the best features of this training, which is approximately two years, is that at the end of the institutional course, the man is given an opportunity to gain practical experience by placement training with a first class apiary while still on government maintenance—or after training, he may have an opportunity to establish himself on a small farm, providing arrangements can be made either through renting or through ownership.

The course in bee culture as outlined by the United States Veterans' Bureau is as follows:

1. Beekeeper—combined with truck gardening or poultry.
2. Requirements of Occupation:
   - Use of hands and feet.
   - Eighth grade education or equivalent.
   - Practical experience in apiary.
3. Units of training, leading to occupation.
   - Instruction training—6 months.
   - Project training worked out at first class apiary.
   - Handling of colonies.

   Keeping record of honey production.
   - Instruction training 6 months.
   - Project training 6 months.
   - Care and management of apiary.
   - Instruction training—School of Agriculture.
4. Time required.
   - Instruction training—18 months.
   - Project training—12 months.

Units of training are the principal ones carried in the leading schools in the United States, and are given in the proper sequence for study in home, placement or institution. They should be modified and adapted to meet conditions in the place of training, either institutional or placement, but units should be deviated from or varied as little as possible.

There are many attractive features about bee culture that appeal to the veterans who are endeavoring to overcome the handicaps. that war has imposed. The tonic effect of outdoor life and the daily contact with nature, is in itself a big factor in the remaking of men, and with the practical application of government training to bring skill in their chosen lines of work, these men may face life with courage in their hearts, faith in the future, and hope in their ultimate welfare and happiness.

RESULTS OF ORGANIZATION OF COOK COUNTY BEEKEEPERS.

(By Samuel Cushman, President of the Association.)

Your President has asked me to tell you what has been accomplished by the organization of Cook County Beekeepers. This I will endeavor to do trusting it may help other County Associations about to be organized or just started.

All who attended the meeting of this Chicago-Northwestern Beekeepers' Association two years ago surely felt that something ought to be done to protect Illinois beekeepers. A number present complained that foulbrood flourished unchecked in Cook County and in the State and that their application for State bee inspection met with no relief. You might have heard, as I did that numberless beekeepers had been put out of keeping bees by foulbrood. That many had abandoned their diseased colonies without any attempt to clean them up, had left them exposed where they were almost sure to infect all other colonies within reach. We also were told that the whole appropriation for the State was not large enough to thoroughly clean up just one or two counties if it was all spent on them. What money was available had to be spread so thinly over the State that it did no permanent good, that the pre-war pay for bee inspectors was about one-half the present day pay for any kind of labor. Competent men could not afford to do the work at less than what they could earn at anything else. The chief bee inspector was helpless without men and money.

Coming back to Chicago after keeping bees where there was no American foulbrood to menace beekeeping I was astounded and dismayed at the conditions described. I did not want to again take up beekeeping under such conditions. It was not safe to buy nearby colonies. If you made a start from package bees from out of the State they might get infected from neighborhood hives in a short time and put you to much expense to save them. Even colonies kept free of disease might be unsalable at their full value on account of suspicion that they might have latent disease present.

I met J. R. Wooldridge, Mr. C. O. Smith and Mr. A. G. Gill at this meeting who deplored bee disease conditions in the county and were willing to help change them. A dozen other local men were invited to meet and talk over a plan to organize Cook County beekeepers. It was at first planned to secure a free hall in a public school building and meet the other expenses by voluntary contributions from those most interested in order to educate the rank and file of small beekeepers. The difficulty of securing the public school hall, when desired, led to the free use of the hall of the Chicago Business College for our first

meeting Monday evening, February 15th. Notices were sent out to a special list of several hundred Cook County beekeepers furnished by Mr. A. G. Gill, also to Chicago newspapers, who supported the movement.

At 7:15 o'clock the school room seating about 40 persons had no standing room vacant and by 7:45 an overflow meeting of over 45 persons was also in session in the adjoining room. At least 90 persons attended. We promised a two hours feast of bee information before taking up the matter of organization and all interested were invited. All were asked to leave their name and address. Off hand talks and questions and answers made this meeting very interesting.

Within ten months from this first call to organize, the Cook County, Illinois Beekeepers' Association was the largest and strongest in the State. It had secured the appointment of two of its members as State bee inspectors for Cook County and the small appropriation granted by the State has been somewhat increased and the pay of bee inspectors raised. It had held four monthly evening meetings in winter with an announced program and an attendance of about 100 persons. Four bee demonstration meetings in summer and fall in the apiary were also held and we had enrolled 125 paid members at $1.00 each.

The second or March meeting was held in a larger hall at the Great Northern Hotel where a larger number would come and especially ladies than would be the case if held in a less accessible public school building away from the center of the city. The advertised attraction at the second meeting was Mr. A. G. Koger, a western producer of a 24-ton crop of alfalfa honey, who answered a list of questions previously prepared for him. This and the election of officers drew the largest attendance of the season, probably 150 persons. After the educational program the association was organized and the officers elected and a large part of the audience enrolled at once at $1.00 each.

Three of our members were the advertised speakers for our third or April meeting at the same hotel and after the meeting the constitution and by-laws were considered. Nearly 100 were present.

The May evening meeting was devoted to foulbrood with the Chief State Bee Inspector A. L. Kildow and Dr. Kragness as speakers and specimens of diseased brood were passed around the room by Dr. Kragness and attendance was large and many there that had not come before.

The four apiary demonstration meetings were probably the most valuable and interesting to most but many were not able to attend on Saturday. The June field meeting was held at A. G. Smith's 50 colony orchard apiary in the Forest Preserve. Demonstrations on opening hives, using the smoker, rearing queens, etc., were made. The early July field meeting at the 80 colony apiary of Mr. A. H. Opfer near Dunning Hospital was a most valuable demonstration of up-to-date methods of requeening colonies in the upper story with the old queen below the queen excluder, extracting by electric power and wintering in long winter cases.

The late July field meeting at the home apiary of Chas. F. Kohr at Ninety-third and Southwestern Avenue was a foulbrood clean up

demonstration by Chief Inspector A. L. Kildow, assisted by the new Cook County inspectors, Dr. Kragness and Mr. Wooldridge. The attendance was the largest of any field meeting and the demonstration was much watched with great interest. Refreshments were served to all by Mrs. Kohr.

The November demonstration of packing bees in outer cases for winter was called too late but a good number braved the cold and exposure and visited the two apiaries of A. G. Smith and Edward Groh.

At each of the meetings new members were enrolled. We had 118 members in July and 125 before the November meeting. Such a campaign required prompt action and a lot of work. We have avoided having papers read at any of our meetings. Face to face talks with no lost time and plenty of action has been the aim. No speaker has failed to be there and all programs have been put through without delay except in one or two instances. We have assumed that time is valuable to the audience and that it should be well filled from first to last to make every one to come again. Discussions of interest to only a few were cut out until the regular program was over. Association business has never preceeded the educational program, but followed it. Intermissions for getting acquainted and exchanging ideas have been provided for between addresses and unlimited time given after the program is finished. Reception committees, introducing committees, and committees for solicitation of membership have greatly aided our success. We have gone the limit in advertising the speakers, telling who they are and what they have done in making our announcements to arouse interest to attend. We have depended on the newspapers to help us and have been much gratified by their cooperation.

Our second year or 1922 program has been much like the first. We came out a little behind on finances the first year. The second year the annual dues have been $2.50 per year. We have had the most prominent speakers and it has been more expensive. We have affiliated with the State Beekeepers' Association and paid them 50 cents per member to insure our members receiving their annual report and monthly news letter.

While many of the first year members did not enroll at the increased rate the second year we did secure over 100 at $2.50 and met all expenses for 1923. We have now provided for associate members at $1.00 per year with all privileges except to vote and hold office and it remains to be seen how many come in on these terms.

"To please and satisfy our audience first and attend to our association business last," has been our motto to increase the attendance.

The Illinois State Beekeepers' Association at Springfield has been very active the past year assisting in the formation of many county beekeepers' associations and all in the State are now uniting to secure from the State Legislature this winter an ample appropriation for the control of foulbrood in this State. Each beekeeper in Illinois is urged to at once do his part, see or write his representatives in the State Legislature asking them to support this movement. Also to get his

local paper to publish information as to the need of this appropriation, also to join his nearest beekeepers' association.

If Illinois will protect her honey producing industry as well as do all surrounding states she will add millions of dollars to the wealth of the State.

Since the widespread growth of white sweet clover (a wonderful honey plant) throughout the State, the only thing that prevents Illinois becoming a great honey State is the lack of State bee inspection and control.

SECURING ILLINOIS PLACE IN BEEKEEPING.

(An address delivered by George E. King, of the Department of Entomology, University of Illinois; delivered at the Convention of the Illinois State Beekeepers' Association, held at Springfield Ill., Dec. 7, 1922.)

MR. PRESIDENT, FELLOW BEEKEEPERS: I feel the call that has been made of me to address you here is a distinct honor. I feel too, my inability to do justice to the subject that has been assigned me, as I have not been in the State long enough to have learned the exact status of beekeeping over all of Illinois; I suppose though that the problems are pretty much alike everywhere.

I listened carefully with the hope of learning something of the number of colonies of bees within the State, and since your inspector has reported that there are something like 166,000, or more, colonies I want to call your attention to a point or two in this connection. This number represents an investment of perhaps over a million dollars in colonies alone. Ordinarily the general equipment of the beekeeper is valued at a figure about equal to that of the colonies. If this be correct there is in Illinois over $2,000,000.00 invested in bee culture. It is important to keep this in mind when legislation and appropriations are asked for, as members of legislative bodies hesitate to enact laws for or make appropriations to foster industries which do not give promise of returns to the State treasury, in the form of taxes or other revenue. In other words an industry must yield a revenue to the State before it can expect to receive much consideration from the Legislature. Since Illinois has this amount invested, and according to the very faulty statistics which we have, stands in rank about the seventh state in the Union in the value of her beeculture interests, it would seem that a much greater fund than is at present available should be forthcoming to protect and foster the industry.

In order to lead up to the thought I wish to present I shall endeavor to bring to you a few ideas of fundamental importance in the form of questions. The question as to the present importance of bee culture in the State has already been answered as well as can be expected with the meagre data available. If an investment of this magnitude were made by a corporation it would be carefully guarded by every means possible, but as the investment reaches over the entire State and is in the hands of thousands of people it is more difficult to comprehend its magnitude.

Has beekeeping been developed to the fullest extent it is capable of being profitably developed? In most all enterprises there are certain limiting factors, especially if natural resources enter in, beyond which

development can be carried on, but not profitably. To better be able to answer the foregoing question permit me to ask three others. Are the bees now within the State now producing as much honey as they should? If they are, why hasn't beekeeping developed much more than it has, and why is it I have found in my limited traveling about the State such small yields, with many colonies of bees on farms producing little if any surplus honey? I hope that this condition does not exist generally over the State. Are the nectar resources of the State being fully utilized? The fact just mentioned would alone be decisive on this point because those colonies that produce little or no surplus honey do not render a reasonable percentage of the raw product they use into a product useful to man; they therefore are only useless consumers merely occupying territory where good colonies would show a decided gain if given the opportunity. We can not then answer this question affirmatively. Are there any areas of appreciable size within the State at present overstocked with bees? This last question again introduces the problem relative to the limits of the possible profits in beekeeping.

So long as the product of the apiary, or anything else for that matter, can be sold on the market at a net profit over and above operating expenses, including the cost of production, labor, transportation, and marketing; that product can be profitably produced. But let the selling price diminish and the cost of production increase until the two become about equal. Then you will have reached a point in which there is no profit left. This is merely a simple business principle, but it applies similarly to a colony of bees. Wherever a colony is located it requires raw products to feed it. If it eats all it gathers there is no surplus, hence no profit. As long as a condition exists wherein colonies are kept merely occupying territory and yielding no profit or there is an absence of bees to gather it, no one can truthfully say that the natural nectar resources of the State are being profitably utilized.

Closely related tc this question on profit is that on overstocking. What constitutes the overstocking of territory? At various times beekeepers have expressed their views on this question with the result that there have been many misconceptions of it. Estimates that 25, 50 or even 100 colonies are sufficient to fully stock a given sized area are absolutely inaccurate. There are some parts of the country in which there is not enough nectar produced to support ten colonies of bees, while elsewhere nearly a thousand colonies could find ample pasturage in areas of equal extent. Stocking and overstocking are only relative terms and either can be determined for any given locality only by actual trial, though there are unmistakable indications always present, while sometimes the flora may be so affected by weather or other factors as to be deceptive. The real test of the capacity of a locality, after all, is made by placing colonies of bees to work it. As long as they are able under the best care to yield profitable returns it may be taken for granted that that locality is not overstocked. Conversely, a locality is understocked if there is a readily available supply of uncollected nectar which could be profitably conserved by the bees if there were enough of them present to collect it. Understocking, rather than overstocking is the greatest

difficulty in this State today. In considering this item we must not lose sight of the fact that during one year one particular locality will yield a great surplus of nectar while the following year it may yield almost none. One is entirely safe in concluding from this that there is ample room for more bees and the production of bigger and better crops of honey in Illinois.

As some of the states about us are just beginning to develop apiculturally Illinois must look well to her laurels and show considerable improvement, or they will outrank her in honey production. She has stood well in beekeeping in the past because of such men as Dr. C. C. Miller, the Dadants and others, but their history will not secure her a desirable place in the future; the beekeepers of the present and future must do that.

At once the problem arises, as to how the industry may be improved. To better express this problem allow its being presented by means of several questions which cover the situation in a general way. 1. Do the beekeepers generally winter their colonies with a loss of less than 5 per cent of their bee population? I do not mean 5 per cent loss in colonies; one might not lose a single colony outright but might suffer a loss of perhaps 50 per cent of his bees. It is not my purpose to criticise anyone unjustly, but I sincerely believe that in this and other respects there are many possibilities of reducing our losses. I can not see any reason why losses in bee population should ordinarily exceed this figure.

To further develop the previous question may I ask: What proportion of the colonies within the State are there built up to 100 per cent working strength by the beginning of the early honey flow in the spring? If I were to ask for answers from each of you on this question, I am afraid that many would reply that their bees could hardly be built up until the clover flow. I too was under the impression that colonies need not be built up to full strength very early, until I began investigating some of these problems, when I very soon discovered that there were good honey flows coming on very early in the spring and the reason we have never recognized them heretofore is because there were not enough bees in our colonies to gather sufficient early nectar to make a showing. It was not until I began working to obtain strong colonies at the opening of spring that I came to realize the size of a good colony of bees. While we look forward toward obtaining the most populous colonies possible we should not for one moment forget the fact that there is a limit here also, beyond which swarming may enter in to upset our plans. Well, the building up of poulous colonies while at the same time exercising the greatest control over the swarming tendency, is one of the highest achievements of the most successful beekeepers. The ability to do this will help distinguish the expert from the amateur, and the time is not far future when those who do not winter their bees with smaller losses so as to have them ready for work as spring opens will lose out in beekeeping and become back numbers.

Perhaps I should not ask the next question I had in mind—Are bee and brood diseases held completely in check throughout the State?—that has been discussed very thoroughly already. The great prevalence of disease is ample answer here.

Are the beekeepers acquainted with the factors which influence the nectar yield, so that they will be able to anticipate the needs of the bees in time to take the greatest advantage of every condition favorable to honey production? It may be unfair to ask this question because there has been so little work done toward giving us real accurate information on this point. As it is a very vital problem and some good general information is to be had on it, beekeepers should not be strangers to all that is known in this regard, but what proportion of them know the first thing of nectar secretion, or even the plants that yield nectar?

Do beekeepers generally understand the nature and peculiarities of honey sufficient to care for it and prepare it for market in the best possible manner? Alas; the condition of some of the honey found on the market tells too plainly the condition we still must work to overcome. Not all honey is marketed in a slip-shod manner; a considerable portion of it is put up very creditably, and is not spoiled in the operation, but the point I desire to emphasize is that even with the best packing there are still some things to do or avoid doing in order to make the product still more marketable. We have not yet reached the point where the ordinary beekeeper has learned to carefully grade and pack his product so as to have it appear most tempting to the consumer.

To sum up it might be asked: Do we need improvement in beekeeping? Inasmuch as any or all of these questions are answered in the negative, the answer here must be affirmative. The securing of Illinois' place in beekeeping is dependent upon a change of such a nature as will permit these several questions being answered differently. How may this be brought about, or better might we ask: What, relative to beekeeping, do the majority of beekeepers at present lack most? The reply can be summed up in one word, but let us reserve it until we have taken a retrospect and made more careful analysis of the question. Let us first consider the requirements which must be met by one who is to be most successful with bees.

The calling of the beekeeper is peculiar. He is not dealing with mere inanimate substance as does the carpenter or machinist; neither is the chief part of his work with beings having a human mind. His work is nevertheless with real living creatures which are subject to numerous influences which govern their activities. While we may not properly speak of bees as being intelligent in the sense that we apply this term to ourselves, we may still speak of them as having highly organized senses and reacting to their environment in a peculiar and perhaps adaptive way. They are subject to definite biological laws such as also govern all other animal life, even including mankind. If a knowledge of the laws of nature as applied to ourselves is of great importance in helping us to overcome such obstacles as disease and other disintegrative forces of nature so that we may live longer and better lives, then the knowledge of these laws as applied to bee nature will be of equal importance to the beekeeper. It will assist him in accounting for what he sees and will also be a guide to his methods of work. The old idea that beekeeping consisted of learning a set of rules and applying them in a hard fast manner to beekeeping-practice was a mistake. Few lines of

work are more specialized requiring greater skill and good sense than this, as it requires a knowledge not only of the bees themselves but also of the effects of weather and numerous other influences upon them.

It is necessary to recognize that bee activity centers around colonial life. This means that bees are so constituted that they are unable to survive if the colony is broken up. While its members are organically separate and distinct no one of them alone is able to provide every need even of itself; thus they are mutually dependent upon each other. For this reason it is absolutely necessary that these intimate relationships be not only uninterferred with, but the environment of the colony should be so modified that the bees will the more easily carry on the functions of the colony. There seem to be many contradictory conditions arise, the most obvious one perhaps being swarming. How is one going to give all colonies the care needed to have them become as populous as possible without having all of this effort wasted because of the bees dividing their forces through swarming; just the thing we don't want, and at the most inopportune time. It takes an expert to do that successfully, and the expert differs from the ordinary beekeeper because of one thing; he has mastered more of the principles of bee behavior and has learned to work with his hands in accordance with those principles—he is trained.

Are the real basic factors governing bee activities well understood by the rank and file of beekeepers? Perhaps the best way to attack this proposition is by a casual comparison of the yields of honey obtained from an average colony, say a hundred or even fifty years ago, with the yields we obtain now. Of course we will all agree that the yields per colony we are now obtaining are far greater than the yields of those times. But, someone may say, we have better equipment and improved methods now. That is exactly what I wish to emphasize. We have better equipment, but it has reached its present state of perfection because it has been developed according to scientific principles. It has been made to conform to the nature of the bees so that they are not called upon to live in an unnatural way to inhabit our modern hives, for example. These hives are well adapted to bee nature but at the same time lend themselves fully as well to the purpose of the beekeeper. Our bee supply manufacturers are to be congratulated upon the excellent quality of the product they turn out.

Can we look forward to great improvements in our apparatus to solve the beekeeper's problems in the future? There will doubtless be some improvement made, but the apparatus question has already received so much attention that there remain, as far as one can tell, only minor details to be worked out. Apparatus has approached quite closely to its limit of efficiency. Further development must come from better beekeeping. By better beekeeping I mean that beekeepers require a more thorough knowledge of bee behavior and greater efficiency in transforming this knowledge into practice—in short, training. The beekeeper of the future will have to break away from the present tendency to over emphasize the mechanical side of his work to the neglect of the scientific, a method by which he handles his bees in a sort of routine mechanical manner. Methods of manipulation must not be lost

sight of, of course, but they should be made a means to an end and not an end in themselves.

To get some information on the present tendency toward the mechanical, to the exclusion of the basic principles in beeculture practices, I went to a beekeeper who has been credited as being one of the best in this country. As he had two sons working with him I asked him a question bearing on this point. To the question I put to him in which I asked whom he thought would finally be rated the most proficient beekeeper he or either of his sons, he replied, "I will." You may think that he was a little jealous of his sons but that wasn't the idea at all. When I remarked that the sons ought to have their fathers' knowledge and experience besides their own so that they should be better beekeepers than he could hope to be, he gave his explanation of the facts as he saw them. He mentioned that his sons had never stopped to carefully study the bees, but instead always brought their problems to him for solution. This resulted in their working more by "rule of thumb" and becoming very skillful in manipulation, but as they lacked a thorough knowledge of bee behavior they sometimes did the wrong thing at the wrong time with disastrous results. The father had spent years making and writing down observations on the bees and reading, so that he had become very well trained as a practical beekeeper; he based practice upon bee behavior.

The word that answers the question: What do most of the beekeepers of the present lack most? is training. The very life and progress of the industry are dependent upon training, and Illinois' place in beekeeping will only be secured as it should be for the future, by training beekeepers. It seems as though there has been considerable misunderstanding as to just what constitutes training. Many seem to have the idea that experience is superior to schooling or other similar preparation, but if I may venture a word here without giving offense to any of you, let me warn you against the man who claims to have been keeping bees for forty years. I don't know why so many of them use this number; perhaps it lends them dignity. If anyone claims to have been at it that long and has had his bees all die off several times, rest assured he has not progressed very far. Avoid his advice, it may be wrong. We don't want to exalt inefficiency though it be as old as the world; we want quality and results. Though your presence here bespeaks progressiveness, one beekeeper who expressed his views by the statement that "there will have to be a lot of funerals before beekeeping makes the progress it should," may be pretty nearly right. Perhaps all here present are in such a frame of mind that you would profit by teaching, but there are more whom one could teach for years but it would improve them but little. Where then shall we look for our trained beekeepers?

The best answer to this question rests with the future beekeepers. Although it may be rather late for some of us to begin now there is no reason why even experienced men should not improve all they can, but see to it that future beekeepers are given an opportunity to receive training and preparation for their work. I do not vouch for the good I could do men who have considerable experience, they may know more

than I do, but if you will give me young men who are interested in this work I will turn out beekeepers who will be able to show results in competition with anyone who lacks training. When I mention beekeepers I don't merely mean persons who "keep bees," anyone can do that, I refer to those individuals who can go out and make beeculture pay dividends.

What constitutes training? Perhaps a little explanation here will make my point clearer. The idea of many of the students, who have come to me, was that they could learn beekeeping in a few weeks or months at most. This idea has also pervaded the minds of a great many of our school officials, because in my short experience some of them have approached me with the request that I prepare my apiculture work so as to give everything in one or two courses and they have insisted that the entire subject be completed in not to exceed two school years. While the most important of the work might be covered in four years, a fairly thorough training could only be given in that time, if it continued during the summer as well as winter.

In order to become thoroughly trained one must have his preparation consist of the theoretical or knowledge phase of the work in combination with the practical side of it. Or, we may say real thorough training disciplines and acquaints the mind with the means of ascertaining what is to be done or avoided, supplies the initiative for and coordinates this with the physical, i. e. the mind and hands work together in the carrying out of these needs in a prompt and skillful manner.

We may now consider briefly how this training may be obtained. the older method of giving training was by apprenticeship, in which the student, possibly a son, spent several years with an experienced beekeeper and learned by working under his direction. Others have begun because they happened to catch an absconded swarm or perhaps by robbing a bee tree, and have simply kept at it. No doubt in any case these persons have also done some reading either from bee books, bulletins, or bee journals, and obtained some information by attending beekeeper's meetings. No doubt most of our present generation of beekeepers have picked up their information piece-meal in this manner and added to it their own experiences. While these methods are commendable in so far as they go, they are all open to serious objection. In every one of them there are many possibilities of one not being thorough; simply because of the difficulty for one without careful direction to properly harmonize and systematize the material presented to him. This results in his gaining a lot of information much of which he is unable to interpret and reduce to its correct relationship with other known facts. To use a familiar expression he finds himself "completely at sea," and much of importance is omitted entirely.

We have an immense amount of beeculture literature, but only a small proportion of it is available to the ordinary beekeeper, and even less of what is available is read by him. This literature is conveniently classified into four distinct groups. The most organized and perhaps most comprehensive literature is that embraced in the text books on beekeeping. This is generally available to the beekeeper and is a very valuable aid to him in his work. While excellent for the general public

there are none of those texts yet published which are entirely satisfactory as texts for class use. The information is contained in them but they are not fitted to our need, so you see there yet remains much to be done in order to get our courses going the way they should. Another class of literature and one of very great importance is that which appears in various scientific journals, as reports of the results of careful investigations into some phase of bee activity. This literature can be found only in libraries and in the hands of workers in specializing scientific fields. Related to this type of literature is that circulated in the form of bulletins by the national and state research institutions. This is very accurate and valuable and should be in the hands of everyone. These bulletins are published to meet a general but immediate need of beekeepers for the information they contain, so generally they are written accurately but in a popular style. The most popular kind of literature is that furnished by the bee journals. They discuss and exchange ideas and give much material in the nature of news, which though important when published is of more transitory value. Some of the ideas expressed through their columns also is of permanent value. From this great accumulation of material we should be able to draw and properly organize upon a sound scientific basis that which is of most value.

Some of you may feel that I am trying to overemphasize the scientific side of bee culture. If so, take a look around you at modern industry in any of its many branches. This has all been developed through the scientific application of natural laws. If you take agriculture as an example and contrast what it was a few decades ago with the farming of today; what do you see? A few decades ago farming was conducted in much the same way as it had been conducted during hundreds of years before, and so it remained until agricultural education was introduced and science was applied to the problems of the farmer. Though beeculture has been taught as a regular course in some of the countries of Europe, for a good many years, it has received but little attention in the schools of this country until the last few years. It is a sad reflection that only this year (1922) a report on educational work given at the meeting of the American Honey Producers' League contained the statement that there is not a man in this country who has had thorough specialized training in bee culture. There are several men trained as entomologists, or along some other line, who have turned their attention to bee culture and they are doing good work; but while there is progress being made under these conditions, we can't expect to make the progress we should until we have specially trained men for this work.

When an institution of learning proposes to give work in bee culture there are certain definite requirements that this work should measure up to, if it is to be of the greatest value. These can be summed up as being: 1. practical; 2. the work must all be based upon correct fundamental principles, i. e. upon the laws governing bee behavior; 3. it must be thorough; and 4, the greatest good can not come of that work unless it is made available to everyone within the State who cares to take up the work.

No work is capable of meeting a distinct and definite need unless it is planned to fulfill a definite purpose. The purpose for which these courses should aim to prepare young men, and perhaps also women, may be briefly summarized to be: 1. Practical beekeepers, including as specialties the production of either comb or extracted honey, queen breeders, and producers of bees to supply the commercial demand for package bees or nuclei. 2. Bee inspectors and extension workers; two activities which should preferably go hand in hand. 3. Research workers to be attached to our State and National institutions to engage in work aimed to furnish information of value to assist the beekeepers of the country in the solution of their problems, and perhaps also to teach classes in beeculture.

There are various methods of giving this work and there is no person in the State but who might take advantage of one or more of these methods of instruction without entailing unnecessary sacrifice on his part. The most direct and more desirable method for all who could attend school, is thorough instruction which should be given by the proper educational institution of the State, as a regular course to students. An admirable method more adapted to the needs of the average beekeeper would be by the organization and teaching of extension classes over the State. Another method of great value is through correspondence courses. Bee culture can be taught very successfully in this manner if the work is carefully arranged and adequate texts provided. To reach its highest degree of usefulness, however, the student must have bees to observe and practice on during his course.

I may as well briefly outline the special equipment needed by a good instructor for this work. 1. A good working library is not merely a help, it is a necessity because of its ability, when properly used, to broaden and give depth to the student's information. 2. A complete apiary and equipment are indespensable in order to allow the students some practice along with their class work. There should be at least one colony of bees for each two beginning students, while advanced students should have from five to ten colonies each, and for special work an entire apiary. 3. In order to give complete and unlimited work, one or more out-apiaries should be provided.

No student should be allowed to go out as a trained specialist in beeculture until he has shown his proficiency by planning and either doing or supervising the work of an entire apiary in an acceptable manner for at least one entire season. If all who expect to engage in beekeeping as a livelihood could receive this rigid training, beekeeping would become so much a part of them that they could meet any situation and master it successfully; then Illinois' place in beekeeping would be assured.

GROWING HUBAM.

(By Edw. A. Winkler, Joliet, Ill.)

Since Hubam seed can not be told from biennial sweet clover seed, care should be used in buying seed, for there have been several already who thought they were planting Hubam, only to find out later that they had either the biennial or a southern variety of annual which blooms late and from which it is hard to get a seed crop in the northern states.

If spring sowing is to be done in the north-central states, only hulled seed should be used and it should be well sacrified.

If it is sown during the winter months, say about February, unhulled seed can be used, which will eliminate inoculation as unhulled seed needs no inoculation.

The soil should be tested for acidity, for lime must be added if the soil is acid. In estimating the amount of lime necessary for growing Hubam it should be remembered that whereas the biennial clovers make their maximum growth the second year, Hubam must make its growth in about six months, and should have about 50 per cent more limestone added than is necessary for the biennial. In other words if a given soil needs a two-ton limestone application, three tons should be used for Hubam.

Limestone should be applied as far in advance of planting time as possible. If at all possible, spread it during the winter months. Some limestone is low in calcium carbonate, while others are high.

All soils do not need lime; but, if much acid is present and a good stand of Hubam is desired, liming will mean the difference between success and failure. I believe you can not apply too much lime on an acid soil.

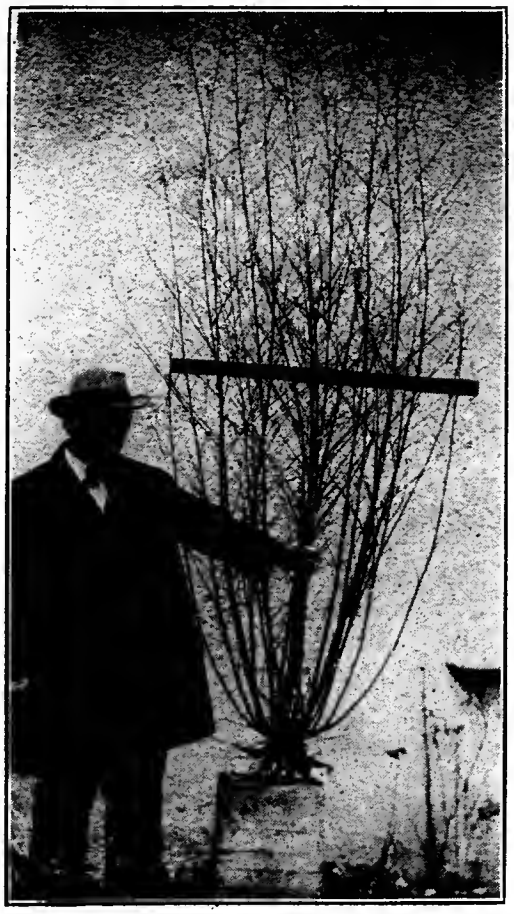
If you plant on soil that has not had a good growth of alfalfa or sweet clover in the past two or three years, inoculation of the seed or soil will be necessary. Complete data on this subject will be found in "Farmers' Bulletin No. 797," which can be secured from the Superintendent of Documents, Washington, D. C.

I had good success in 1921-22 by pulverizing dried earth taken from an embankment where biennial sweet clover has always grown very thick. I put about two tablespoonfuls of furniture glue in a quart of water, and mix a quart of this solution thoroughly into one bushel of seed, then add one to two quarts of the pulverized soil, mixing it thoroughly. The seed will be dry and ready to plant when through mixing. Inoculation should not be done until nearly ready to plant.

After seeding, the seed should be covered by rolling or harrowing immediately, as the bright rays of the sun will kill the inoculation within an hour or two, if not covered.

At the prevailing price of Hubam seed, growing Hubam commercially in rows, cultivating and hand-weeding it are entirely out of the question, and the difference in seed production planted alone broadcast and seeded in a nurse crop with grain is so small that almost all acreages of Hubam in the future will be planted in with grain.

If planting in with spring grains, it will be a good plan to disc and harrow the grain seed in, then broadcast the Hubam seed, tying a couple of beams from an old harrow with the teeth in them behind the broadcast seeder and follow up with a corrugated roller. The cultipacker is much better than the corrugated roller. In the absence of a



A Hubam stalk that produced seed in 1921. Hubam is a great seed producer.

roller, it is better to broadcast the Hubam seed before harrowing the grain seed in. Sweet clover requires a well settled and firm seed bed, with just enough loose soil on the surface to permit the seed to be well covered.

A field of oats and Hubam last April was planted with an endgate seeder, first discing the oats in, then seeding the Hubam and harrowing crosswise. It is a good plan to seed as early as the weather will permit, the earlier the better. Although there is a critical time when the seed is in the milk stage that a killing frost will injure it, as soon as the clover has rooted it will stand some very cold weather. I had a field in 1921 that was one inch out of the ground when it turned cold

and three inches of snow fell, yet the stand was good, very few plants having been killed.

When planting in winter grain a good plan is to seed in very unsettled weather with a hand grass-seeder that covers about 16 feet wide, allowing the rains to wash the seed in, as at that time the soil is spongy and porous and it is almost impossible to get the horses on it. Planting with a press drill is much better if the ground is dry early enough to go on with a horse.

Some growers are advocating 15 pounds of Hubam seed per acre when sown with grain. I have seen excellent stands that were planted, 10 pounds per acre, on well-limed soils. If the soil is hard clay 15 pounds will not be any too much, but 10 pounds will be plenty on a black bottom-land soil. I have seen very good stands this year planted five pounds per acre, but they were a bit thin after the grain was cut off. Seed that lies in the ground all winter seems to get a better start in the spring than spring-planted seed.

Occasionally a plant of Hubam will seed its first year, live over winter and will resemble the biennial but grows much larger than the biennial. These plants are rare and rather far apart. Whether the seed of the second year will revert to the biennial form or not is not known, but I will plant a few ounces of this seed next spring to ascertain what percentages will be annual and biennial.

The Hubam will be just starting to bloom when the grain is cut off, and inside of two weeks after the grain is cut the stubbles will have many shoots on and become whiter with bloom every day, especially if a rain comes shortly after cutting the grain.

If sown in a nurse crop and nipped off with the grain, it is set back a little; but the field seems to mature more evenly, does not grow so tall and rank, yet has many more branches than when seeded alone broadcast.

Almost all fields here were cut with a grain binder early in the morning while the dew was on, although good success was obtained on one field cut with a self-rake mower. While there may have been some seed lost when cut with the mower, two bags of seed per load were secured. Time in cutting as well as twine was saved. Farmers' Bulletin No. 836 gives complete data on harvesting and thrashing the seed crop.

A good way to determine when the seed crop is ready to cut is to test several average places in the field. Draw an armful together as if it were cut and tied with a binder. Then determine whether three-fourths of the seed pods in the bundle are brown to black. If so, it is ready to cut, for there is enough nourishment in the stalks for the other one-fourth, they being all full-grown.

There will still be some in bloom at the time of cutting, but one must take the average. The lowest land, which will not be so far along, may be left a week longer. Being so late at the time of harvesting, Hubam needs about two weeks to dry before hulling.

The No. 9 Birdsell Huller is the only huller I know of that is adapted to hulling sweet clover successfully. The huller being a rather

complicated machine and sweet clover hulling a bit new, very few hulling jobs I have seen have been satisfactory. I believe the fault lies with the operator of the machine. Most operators fail to set the rasps up close enough and allow some seed to come out unhulled; whereas if enough wind is put on and the tailboard lowered, all unhulled seed will be blown over into the tailing elevator to continue around through the rasp again.

Although the seed is not quite clean when run through a grain separator equipped with the hauling attachments, it gets all the seed and hulls every seed. The regular clover sieve made of perforated zinc, which is part of the equipment, has perforations too small; but in using regular window screen of the 14-mesh galvanized wire, all the unhulled clover passes over it and into the auger and thence back through concaves, while the hulled seed passes through the screen and out the spout. The seed has a little more chaff and dirt, but is readily cleaned up with a good fanning mill.

The expense of a separator is much less than the huller and takes the clover just as fast as a No. 9 Birdsell. All that is needed extra is the hulling attachments, which can be bought very reasonably.

WINTERING BEES IN ILLINOIS.

(By E. F. Phillips, Apiculturist, U. S. Department of Agriculture, Washington, D. C.)

The subject chosen for this paper may be slightly misleading, in that the discussion is not confined strictly to conditions peculiar to the State. Illinois lies in that part of the United States in which wintering has certain peculiar difficulties, and in order to bring these out, the general problem for the middle latitudes of the eastern United States must be discussed. These difficulties in wintering in the region where the winters are not exceedingly severe have not been discussed in the beekeeping literature so thoroughly as have those which arise from extremely low temperatures. In regions where there are usually several days during the winter when the bees can fly, beekeepers quite properly have decided not to winter their bees in cellars. Perhaps a special danger lies in the fact that where weather conditions are not so severe the beekeeper is often tempted to give the bees less care at this season than they demand, and this neglect is greater than would be possible in regions of colder weather. The winter losses in moderate climates are as high as, and sometimes higher than, those in regions much farther north, which is adequate proof of the seriousness of the problem.

For the outdoor wintering of bees, the first thing that comes to mind is insulation of the hives to prevent the loss of heat from the bees. That this is vitally important can not be questioned, yet it sometimes receives undue emphasis in the minds of beekeepers. In providing insulation, attention should be given to the fact that the heat of the cluster may be lost in all directions almost equally. Some beekeepers place packing material on top of the hive and leave the rest unprotected; others insulate the top and sides and leave the bottom unprotected. Insulation or packing is placed about the hive to prevent the rapid escape of heat generated by the cluster. If insulation is placed at any one part of the hive, the heat tends to escape less rapidly at that point, but if some other part is left unprotected, the heat, with almost uncanny directness, goes to the point of easier escape and is lost to the cluster. It is well known that warmed air tends to rise, this being one of the most commonly observed phenomena of heat, and on this basis alone beekeepers sometimes conclude that if they retard the loss of heat at the top of the hive, the heat will not be lost. This is, of course, false reasoning, for the heated air circulates through the hives and the heat may escape elsewhere. Tests which have been made (published in Department of Agriculture Circular 222) show that in commercial double-walled hives the greatest loss of heat is through the unprotected

bottoms. This is clear evidence that a beekeeper who leaves any considerable portion of the hive unprotected is not giving the bees much actual protection.

The amount to which the entrance should be closed has been a subject of warm debate, some beekeepers leaving the entrance as open as in summer, even though the hive is packed, while others close the entrance as much as possible. It sometimes happens that a small entrance is clogged by dead bees, and therefore the beekeeper finds himself between the danger of allowing the bees to become too cold and that of smothering them. The happy medium would be to have the entrance just so that it will not be clogged and also so that the bees will not be subjected to too great cold. How shall the beekeepers determine what this point is? In the first place, the clogging of the entrance is characteristic of inadequately protected colonies, it never occurring in thoroughly protected, well provisioned, strong colonies, except perhaps through some accident in the adjustment of the packing material. In thoroughly protected hives the inside temperature throughout the hive is sufficiently high so that the bees clean out their dead and cast them outside the hive even in zero weather, and under such circumstances there will be no accumulation of dead bees at the entrance. On the other hand, for improperly protected hives, there is serious danger in closing the entrance too much. Leaving the entrance wide open to a large degree nullifies the benefit from what packing is used, for if too little packing is used the entrance must be left so wide open that there is a rapid loss of heat at that point. It is a safe rough rule that a colony that during the coldest weather can not stand an entrance reduced to a three-fourths inch hole is insufficiently packed. The size of the colony has very little to do with this, except that weak colonies usually need a larger entrance than do larger ones, because of less ability to clean out the hive in cold weather. This is quite the opposite of what many beekeepers have reasoned out for themselves, on an incorrect conception of the physics of the hive. It may be added that without bottom packing a small entrance is always dangerous, which is additional reason for thorough packing beneath.

Having now discussed briefly the two points on which beekeepers argue most, it may be well to go to perhaps the most important phase of wintering in mild climates, namely the question of stores. In the far north the honeys are whiter than they are, even from the same species of plant, farther south. The increased darkness of the honeys in the middle latitudes is an indication of the cause of perhaps the greatest loss in these regions. Dark honeys usually contain more materials which the bees can not digest than do the lighter ones, and this indigestible material accumulates in the bees to cause the condition commonly known as dysentery. In the southern states where the bees fly almost daily, this accumulation usually causes no trouble, but in the most northern parts of the country it would be almost sure death to every bee in the apiary to winter on such honey. In the middle latitudes where occasional flights usually occur, beekeepers often fail to realize

what their losses from this source actually are. The beekeeper usually speaks of his bees having dysentery only after they begin to spot the hives, but a careful study of bees during winter reveals the fact that they show increased activity from the accumulation of feces long before they spot the hive. Unless they have frequent flights the bees may be so worn out from this cause that, while there may be live bees in the hive in the spring, they are capable of very little real work during the heavy brood-rearing period of spring.

This, then, is perhaps the greatest cause of weak colonies in the middle latitudes, and while the actual average percent of full colonies that die is no greater in this region than in the region of better wintering stores farther north, the actual loss is often even greater than it is a hundred miles farther north. There is no adequate way to express loss from weakening of the colonies from this cause, and, in fact, beekeepers often overlook it entirely.

The remedy is a fairly simple one, and has been given so often in print that it should not be necessary to repeat it, except that many beekeepers have not recognized the fact that it applies especially to the middle latitudes. In the fall, soon after all brood-rearing has ceased but before cold weather comes, bees usually take down warm thick sugar syrup readily. They do not store this syrup in the same part of the hive to which surplus honey is taken during a summer honey-flow, but now place it below the circle of honey in the brood-combs, just where it will be used first during the winter. Ten pounds of sugar as a thick syrup will carry the bees through, if they have a fair amount of packing, until such time as flights are fairly frequent, after which the indigestible materials in dark honey do no harm. Better results will be obtained if this syrup is inverted by the use of acid during the process of manufacture. This method is found in any good bee book. Many beekeepers argue that this inversion is unnecessary, since they do not recognize the work required from the bees for this effort. Space will not permit a full discussion of this point here.

It is often hard to convince a beekeeper of the middle latitudes that his honey is not the very best for winter food. He is perhaps not familiar with the lighter honeys from the North, or, like all humans, he thinks that what he himself has produced is the finest product possible, but the fact is plain to everyone who has had opportunity to see honeys from all parts of the country that the whitest honeys are characteristic of the North. There are certain exceptions from high altitudes, some arid regions, and a few other places, which do not vitiate the general statement for the eastern United States made above, these exceptions being however no exceptions to the general rule as based on the physiology of plants.

Another factor in the poor wintering stores in the middle latitudes is that there are many plants belonging to the Compositae (asters, goldenrods, sunflowers, etc.) which here secrete nectar in the fall, and in this region these honeys are poor for winter. That these come in the fall of the year, rather than in the spring or summer, is rather unfortunate for the beekeeper, for in the fall they are normally stored just

where the bees will reach them during the coldest weather. It is interesting to note that some of these same species which cause such poor honey for winter produce honeys farther north which are fairly good for wintering, even with the longer confinement of the North. To the general rule that dark honeys are poor for winter, one exception must be stated, namely that buckwheat honey is good for wintering, the color here being of different character. There is almost no buckwheat honey produced in those regions which are here being discussed, since this plant secretes nectar well only in regions of cooler summers.

There are other difficulties of the middle latitudes which can not be discussed fully here, and some of these have an application to the wintering problem. The journals often give reports of beekeepers in the North who divide a single colony into perhaps ten small nuclei and at the beginning of winter have from them ten good colonies. The middle latitude beekeeper may be inclined to disbelieve this tale, for in his region such increase is virtually impossible. Beekeeping is full of the most astonishing apparent paradoxes, several of which have been mentioned earlier, but these apparent paradoxes are only apparent, not real. There is rarely if ever as heavy a daily nectar secretion in the middle latitudes as in the North, there is usually a long dearth in summer and the fall secretion of nectar is less intense, all of which factors combine to make it more difficult to get a small nucleus to full strength in a few weeks, as can frequently be done in the North.

These difficulties have been mentioned here, not so much to give the full details of methods for overcoming them, as to impress on the beekeepers of this region the fact that with them the wintering problem is fully as serious a matter as it is for their fellow-worker a hundred miles or more to the north. Because of these difficulties a beekeeper may year after year winter his bees badly and never discover it, unless his attention is called to it. In many cases colonies stay weak year after year because they never have a fair start in the spring, and this may happen without the knowledge of the beekeeper. With so serious a problem, the middle-latitude beekeeper should study the literature on wintering with the greatest care and should aim to apply every precaution to prevent loss, and especially to prevent weakening of the colonies. He will have all the harder time with this because he will to a considerable degree be alone in his effort and may not have the council of neighbor beekeepers who have succeeded in preventing the losses. The beekeeper who is not making the most of his locality in the middle latitudes will do well to imitate the wintering methods of his co-workers farther north to the greatest degree practicable.

It would be quite possible to cite instances in the middle latitudes where excellent crops of honey might be obtained, but which are lost by most beekeepers because of poor methods of wintering. There can be no doubt that Illinois, and every other state in the middle latitudes, is full of such instances. A careful study of the needs of the bees is the only way to prevent a constant loss of the type here outlined, and with this must go the full realization of the beekeeper of this region that he has a harder problem to solve because of the very traditions which have grown up about the business in his region.

POPULAR ERRORS.

(By C. P. Dadant, Hamilton, Ill.)

Many popular errors are injurious to the beekeeping interests, because they create an unfair prejudice against bees. To know what these are, and to be prepared to answer them and demolish them is of great importance to the honey producer. If we could educate the people properly upon these matters, we could secure a much greater regard for our industry.

I will therefore confine myself to a consideration of the errors usually current among the public on the question of bees and honey.

One of the most common errors is to believe that bees are injurious to sound fruit, principally grapes. The grape grower, in times of honey scarcity, when his grapes are ripening, sees bees upon damaged grapes and takes it for granted that they are the authors of the damage. This is incorrect. Bees cannot damage sound fruit. The physiological fact is that their mandibles are not armed with teeth. They are made of a horny substance, and are shaped much like spoons, working together sidewise instead of up and down like our own jaws. They can pull apart cloth, paper, and some harder substances, because they take hold of minute fiber that project and pull upon them until the fabric comes apart. But the skin of fruits is smooth and hard enough to prevent them from boring through it. Some people think that the bees sting the fruit. That is another mistake. If they did so, some of their poison would get into the fruit and make it deadly to them as well as to other insects, for the poison of the bees is stronger than that of the rattlesnake, though in much more infinitesimal quantity.

The actual test which proves that bees cannot damage sound fruit is that we can starve them on it. Take a bunch of sound, ripe grapes, crush one berry, puncture another berry slightly with a pin, then put the bunch in the center of a hive of bees, right in the cluster. Examine it the next day, and you will find that the crushed berry has been entirely sucked dry, that the punctured berry has been sucked down to a certain depth, but that no other berry has been touched.

So the bees cannot damage sound fruit and their action upon damaged fruit is simply a provision of nature which dictates that nothing should be lost. However, in the case of bees, if a bad winter comes and they have much of this unsound juice in their hives, it makes them sick and many die, for it ferments and even turns to vinegar in the cells.

Many people take things for granted, without hunting for proof, other than a casual observation. That is not astonishing; and we would

all be inclined to assert, for example, that the sun turns around the earth, instead of the earth turning on itself in 24 hours. It took the knowledge of the astronomers to teach us that the sun is immovable, as far as we are concerned, and that we are revolving in space at the speed of a cannon ball. So a man is quite excusable in believing things that are not so, although they appear so.

Another error common among the people, though in less degree than the former, is that bees damage flowers when they work upon them. Bees are beneficial to flowers. In fact many flowers need the agency of insects to fertilize their fruit. Apple trees, pear, plum, cherries, raspberries and many other fruits would be barren if it were not for the insects which help distribute the pollen upon their pistils or female parts.

Horticulturists have tried covering apple buds with gauze and keeping them covered until after the bloom, and in all cases, few if any of those blossoms bore fruit. Similarly if the blooming takes place in rainy weather, when insects such as bees cannot visit the blossoms, the blooming is a failure. Of if a very strong wind blows during the best of the blooming, one will perceive that the tree has most of its fruit on the sheltered side, the insects having been unable to withstand the strength of the wind on the windy side.

There are plants upon which the male and female parts are on different blossoms. Such are the melon, the pumpkin, the cucumber. If you look carefully at the blossoms of these plants you will see that some have the rudiments of the fruit under them while others look barren, having only a blossom with stamens, but no little round fruit under. These are the male blossoms, which bear the pollen or fecundating dust of the flower for the other blossoms.

Among strawberries, there are kinds which are only staminate, others pistillate. Without the help of the bees those strawberries are barren.

We might go on indefinitely on this subject. Clover for instance needs the bees to fertilize and to bear seed. You are probably aware that the first crop of red clover does not yield much seed. That comes from the fact that the bumblebee is ordinarily the only bee that can get honey from the long corolla of the red clover. There are but few bumblebees in spring, so there is but little fertilizing of the clover. But in summer, when the second crop blooms, the bumblebees are numerous and it is readily fertilized. The honeybee cannot suck honey out of red clover, except in some extraordinary seasons when its corolla is short. In 1916, the dry spring caused the red clover to have a short corolla in our vicinity and the result was that the farmers were greatly astonished to find that the first crop had plenty of seed. We knew why, for we had seen our bees harvest honey from it.

Red clover failed to yield any seed, in Australia, until at Darwin's suggestion, they imported bumblebees into that country.

It is therefore very evident that bees are beneficial to flowers. The horticulturists who, thoughtlessly, spray their orchards during the bloom and thus poison many bees, are working against their own in-

terests as well as those of their neighbor beekeepers. The proper time to spray an orchard is just before and just after the bloom. Spraying during the bloom also destroys much of the pollen by diluting it in poison and thus decreasing many chances of fertilization.

Another error often made by the public is to think that the little yellow or brown pellets that the honeybee brings to the hive are beeswax. Those pellets are pollen, the fertilizing dust of the flowers which I have just mentioned. The bee gathers this pollen to be used in feeding its young, the larvae which occupy the cells and grow there, finally transforming themselves into perfect winged insects. The queen lays eggs into the cells; in 3 days those eggs hatch into little worms which are nursed until they are large enough for their transformation into chrysalis. Then the bees seal the cell with a capping of wax and other material. At the end of 21 days from the time the egg was laid, a young bee with wings comes out of the cell. The food of this young bee while in the larval or worm state is a pap made by the digestion of honey and pollen in the stomach of the nurse bees. Beeswax, instead of being brought in from outside, is produced within their bodies, much like the production of milk in the cow or fat in the hog. Wax is a fatty substance and its production is made from honey, voluntarily or involuntarily by the bees, and it takes as much honey to produce a pound of wax as it takes corn or feed to produce a pound of fat. The proportion depends, as we all know, upon the conditions in which the animal finds itself, being greater when conditions are unfavorable and less when they are favorable. It is commonly accepted that comb costs the bees from 7 to 20 pounds of honey for each pound of comb produced, the average amount required being about 10 pounds to 1. So if we can sell our honey at 20 cents per pound, the comb in which the bees store it costs us $2 per pound. That is why we use what is called a honey extractor, a machine which throws the honey out of the comb by centrifugal force without damaging it, so that it may be returned to the hive to be filled again. Extracted honey costs the beekeeper about half what comb honey in sections costs him to produce. That is why extracted honey often sells at less than comb honey, though it is in every way as good.

Another error is to believe that all honey should be alike in color and flavor. Honey varies just as much, in taste and in looks, as flowers vary. White clover honey is usually water white and of a very mild taste. Basswood honey is also white, but of very aromatic flavor, tasting just like basswood blossoms smell. Heartsease honey is of pink amber, Spanish needle and golden rod honeys are of bright yellow color and strong flavor. Buckwheat honey is dark brown and smells and tastes just as one can imagine when passing by a field of buckwheat in full bloom. Honey-dew, which is a product of plant lice, is the poorest of all, being almost black and of very indifferent flavor. But all honey is sweet, containing about 85 per cent of saccharine matter, while the vile glucose made of corn starch and sold under golden names, such as Karo, or Redclover, or other fancy names, contains less than 30 per cent of sweetness. People who fear adulter-

ation in honey should taste it. They would soon recognize whether it was sweeter than those cheaper syrups.

Many people are also unaware of the fact that honey will harden, granulate, or candy, when it is exposed to cool temperatures after it has been taken out of the combs. Many imagine that such honey is either spoiled or adulterated, when the fact is that the granulation of honey is a test of purity. The people who imagine that honey "turned to sugar," as commonly said, are helping the dealers in cheap corn syrup to fool them by making them believe that that cheap product is better than granulated honey. The fact is that honey has three times the sweetening power of commercial glucose.

By the way, here is another popular error which should be demolished. That is the belief that there is such a thing as manufactured comb honey. One of the noted chemists of the United States some forty years ago, told as a hoax that there were factories where the honey comb was manufactured out of paraffine, filled with commercial glucose, and sealed over by machinery. He also said that there were manufactures of eggs and that the only difference between those eggs and the natural hen's eggs was that the former could not hatch.

This story was accepted as true by many newspapers at that time and there are still many who believe that there is such a thing as manufactured comb honey. The chemist who invented that story excused himself by saying that he did not think people would be so gullible as to believe it. But we find it necessary to fight it even at this late date, because since the invention of comb foundation, the combs of honey in little sections are always straight and almost perfect and this helps to entertain the error.

Aside from the fact that the making of the entire comb is an impossibility, there is a very easy way to convince the man who will listen of the incorrectness of this idea. The combs of bees are just like the leaves of trees, although all built in the same way, on a similar pattern, there are no two alike. You might spend a whole day putting tree leaves side by side, you should never find two exactly alike, no more than you would find two men exactly alike. In the same manner, you might spend a whole day placing sections of honey side by side, you would find no two combs alike. If they were made by machinery there might be half a dozen patterns but you would find many exactly alike.

That which gave plausibility to the story was the manufacture of comb foundation, which is the making of the base of the honey comb out of beeswax, the bees' own product, and giving it to them to build upon. This secures perfectly straight combs and makes the labor of the beekeeper a pleasure, in the production of honey. But the bees accept only beeswax foundation. Attempt by dishonest manufacturers to give them foundation made out of a mixture of paraffine, have always proven a failure, for they know their own product and will accept no other.

Now there is still another error into which even inexperienced beekeepers fall, that is the belief that the little bee-moth can do injury to bees. The bee-moth feeds upon old combs. The winged moth lays

its eggs at the entrance or on the cracks of the hives of bees, and when a colony is too weak to care for its combs the little worm which hatches enters the hive, makes webs through the combs and finally destroys it.

In other words, the moth grub is a scavenger, just like the grub of the carrion fly which devours the bodies of dead animals which are left exposed to the air in summer. But the moth can no more injure a healthy colony of bees, which contains a queen and a sufficient number of bees to cover its combs, than the carrion fly can kill a healthy cow by laying eggs upon its hide. Both the moth and the carrion fly have a mission to fulfill and if we suffer from their actions we have only ourselves to blame. The trouble, in the case of bees, is that when a colony is very weak, the bees in it crowd about the entrance all day long and the casual observer may imagine that the colony is strong, while probably all the bees are there, on the outside. When night comes, the bees reenter the hive; then the moth, which is a night bird, comes and lays its eggs near the door. The tiny little creatures, when they hatch, enter the hive and hide in the combs, eating their way as they go. Soon the hive is entirely filled with them and the beekeeper says: The moth killed my bees. It is only his ignorance which is the cause of their death.

It is very important for beekeepers to fight these more or less unreasonable errors, for most of them work to their detriment with the masses. If no one mistrusted the purity of the honey which our bees produce, the sales of honey would be eight or ten times as numerous. In fact we could probably not fill all the requirements of the trade, in our most successful seasons. So it behooves us to post the public in every way on the popular errors concerning bees and honey.

THE FUTURE OF ILLINOIS BEEKEEPING.

(By A. G. Gill, Chicago, Ill.)

Your secretary wrote that he was putting me on the program for an address here. I am not given to making addresses, and I will not try to do so.

I do not want, however, to let this opportunity pass without some say in this way. I want to express my faith in the future of the beekeping business and particularly as it pertains to Illinois.

Concerning the economic conditions of the country I am optimistic. Recently I sat in a session of the Southern Commercial Congress at Chicago and heard of the earnest effort being made to get this old world on a more stable basis. Men are studying seriously how business relationships between Europe and this country can be put on a more stable basis, and undoubtedly in the not distant future commerce will be moving in abandoned channels and on a more normal basis again.

The effort to put through ship subsidy legislation and efforts to broaden our credit system to relieve agricultural distress are examples of what our leaders of men are doing to improve conditions, and I doubt not but that the difficulties of the present time will rapidly be overcome. As we are nearing the end of our financial depression period there is more honesty, integrity and earnest effort in every industry. Men are realizing that only as every man produces his full share will there be abundance for all.

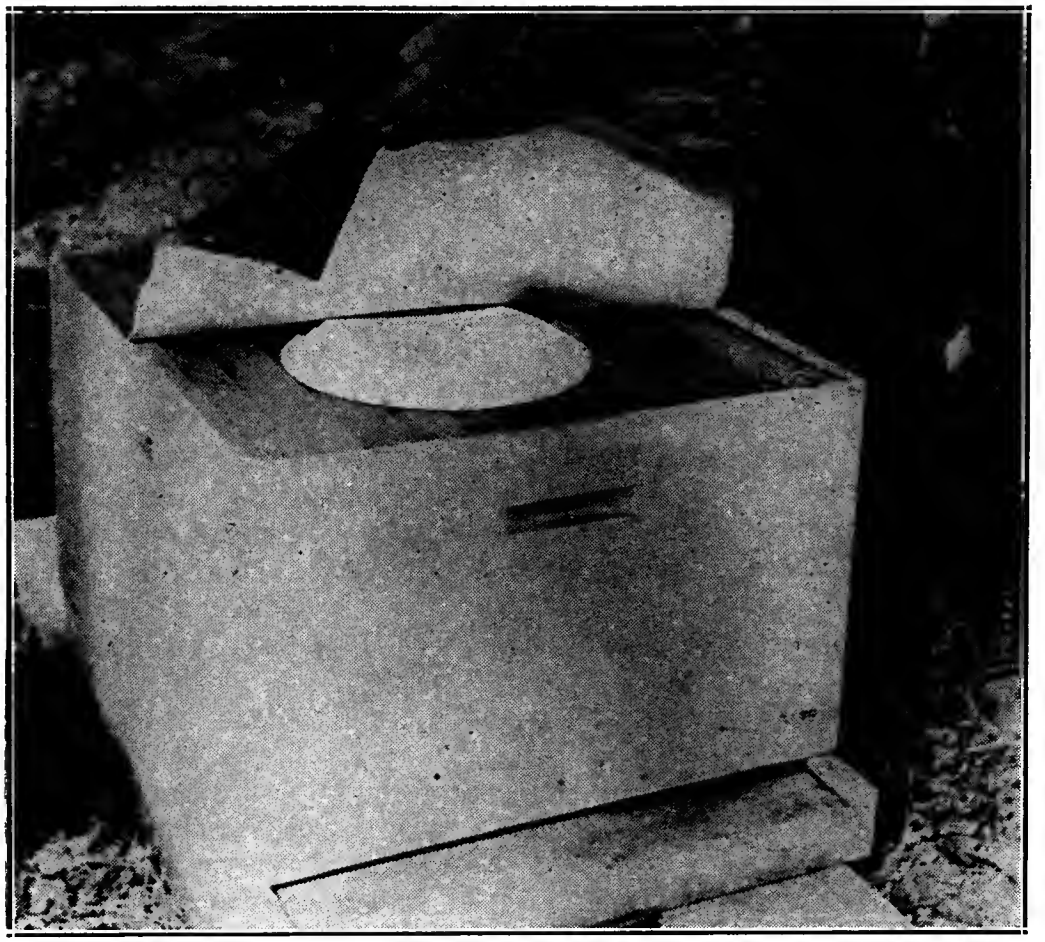
This is the day and age when the philosophy of the brotherhood of man prevails. Formerly every man was pretty much a separate entity in the work of the world. He made nearly all the things he used. Today we are very dependent on the other fellow, and any advancement for the common good must be the result of combined effort; of cooperation by the mass of men.

These are times therefore when naturally men will consider another's welfare and the good of the whole as never before. If we have leadership our beekeepers will rally to support a good program. It is a logical time to press the needs of beekeepers before each other beekeeper and those who have power and authority to act in legislative matters, and it is a time when consideration will be given a demand for courses in beekeeping, experimental work to determine best methods, and extension endeavor on the part of the State.

I am not going to undertake to say just what we need from the hands of the State. That is a thing which will require careful study on the part of some of our beekeepers. I am not one of those who believe in throwing away all the old and starting all new again. I believe

we have had some earnest endeavor made to improve conditions and things are much better than they might have been even though the appropriations have been very meager. Rather I should say that on the foundations already laid we must build for the future.

In a general way then we want every young man or young woman who wants to study bee culture to have as good an opportunity here in Illinois as is given in neighboring states. We want as good plans for prevention, eradication, and extermination of disease as are made in any neighboring state, and we want a sufficient appropriation to work



Sugar candy inserted in the cluster makes an excellent way to feed in very early spring.

these plans. We want an extension program by which a knowledge of correct methods can be taken to the beekeepers who cannot come to a University to study.

As to inspection and the spreading of a knowledge of beekeeping, our best beekeepers must always be ready to lend themselves generously. Beekeepers cannot afford to hold aloof from their fellow beekeepers. I know of a number of beekeepers who without consideration of pay have spent days in helping neighbor beekeepers—teaching them to care for their bees right and helping them free themselves of disease when found. Friendly cooperation among beekeepers will help greatly in

improving community conditions and eliminate much of the cutting in selling prices.

In the matter of inspection, regardless of what our State appropriation may be our beekeepers in every locality should be ready to respond in friendly aid—by gathering information relative to the location of every apiary and with their automobiles and knowledge of localities aiding in rapid movement of inspectors.

Inspection and extension work in particular and University courses are apt to be expensive undertakings so far as each item of work done is concerned. Men traveling about lose time and spend money so that large appropriations are easily consumed. We must ask for a much larger appropriation, but I want to plead for a most earnest study on the part of our beekeeper leaders that plans be made so that every dollar of this money will produce results.

In the placing of men in positions to serve our beekeeping industry I hope we can always have honest men who will work hard to earn the money paid them. These men ought to have in experimental work, educational programs, and inspection work jobs big enough for them.

In conclusion let me say that I am hoping Illinois may get on just as high a plane and just as substantial basis relative to its beekeeping industry as neighboring states. Sweet clover is being cultivated widely and spreading over the State, and it is rapidly improving as a honey producing State. Illlnois should rank with Indiana, Michigan, Wisconsin, Iowa and other states in the importance of its beekeeping industry and the attention given it by the State.

COST OF HONEY PRODUCTION.

(By Frank C. Pellett, Associate Editor American Bee Journal, Hamilton, Ill.)

Farming is one of those uncertain enterprises in which it is impossible to reduce the cost of production per pound or per bushel to a certain definite figure. The cost varies greatly according to the size of the crop and there is no way of gauging in advance the amount which can be produced from a given area.

The manufacturer whose raw materials have a fairly stable cost and whose output is constant, can estimate the cost of production in advance and finds but little variation from time to time. The farmer, on the other hand, is subject to so many factors which are beyond his control that his costs must vary accordingly. Heat, cold or rainfall determine the quantity of his output to a large extent, yet he is unable to control them. Animal and plant diseases and insect pests are beyond his reach, although to some extent they can be controlled or their injury curtailed. Their presence, however, increases his cost of production.

In any line of agriculture the cost of production up to a certain point is the same for a big crop as for a poor one, or for no crop at all. The cost of harvesting will be smaller in case of a failure, but the other items remain the same. The cost per bushel or per pound will be high or low according to the size of the output.

Beekeeping Problems.

The beekeeper is still somewhat in the dark as to some of the factors which determine the quantity of his production. The raw material from which his finished product is made is nectar, a thin watery fluid found in the flowers. The quantity of nectar available to the bees varies greatly under different conditions. Not only must there be an abundance of bloom, but other conditions must be favorable also if the beekeeper gets a crop. The nature of the soil has an important influence on the quantity of nectar secreted, but there are other factors also, for blooms yield nectar freely one year and not another, on the same soil. Temperature, humidity and rainfall all have an influence, as well as some other factors which are not, as yet, understood.

The beekeeper has made great advancement in his knowledge of essentials in the past few years, and beekeeping is a far more dependable occupation than it was a generation ago.

Limits of a Location.

In other lines of agriculture one can increase the size of his plant up to the limit of his capital or ability in one situation. In beekeeping, however, it often becomes necessary to scatter his bees over a wide area because of the limited amount of forage within reach. If we take 500 colonies (hives) of bees as the average number owned by a commercial beekeeper, we find a great difference in the necessary overhead depending upon his locality.

In northern Georgia there are places where it is not possible to keep more than 25 to 30 colonies in one yard with profit. In spite of this fact, the writer knows men who own as high as 800 colonies in that region. It will require about twenty apiary sites which must be at least two or three miles apart to care for the 500 colonies which we have taken as an average. In localities which will support such small units there is much waste land, and rentals for suitable situations are usually low.

In contrast, however, there are locations in the buckwheat region in New York where 300 to 600 colonies are kept in one apiary. The writer has visited beekeepers there who keep 500 or more colonies in one yard and thus reduce expenses to a minimum. There are few places which will not support more than 25 colonies and fewer yet which will support as many as 500. In general, it may be said that the average locality will maintain from 50 to 125 colonies in one yard.

Factors of Cost.

From the above it will be seen that one of the big items of expense is transportation. The final item of freight on the finished product from apiary to market is small compared to the cost of auto travel to and from the various apiaries day after day during the season. Many beekeepers use large trucks for outyard work, and the mileage on such a machine is heavy. In California and some other western states, migratory beekeeping is practiced and the same apiary is moved two or more times during the year in an effort to get a harvest from sources not within reach of a single site. In many large concerns the item of transportation is nearly as large as the labor cost, if we include with transportation the loss of time consumed in travel.

At the Dadant apiaries, which are distributed for about 35 miles along the Mississippi River near Hamilton, Illinois, the labor cost for one year was $1,925.00, while for the same year the transportation cost was $875.00. The following year the labor cost was $1,400.00 and transportation cost was $738.00. There are about 700 colonies of bees in nine yards. Since the bees are handled along with other work only such time as was actually spent in caring for them was charged against them. Where a man has no other business his entire time for the year will have to be considered as part of the cost.

While transportation and labor are the big items of expense in honey production on a large scale, there are other items which add no

small sum to the total. Interest on the investment and depreciation of equipment, sugar for feeding when natural stores fall short, queens to replace those which fail, containers for the crop and rental of apiary sites must be included.

Some Colorado Figures.

The only figures available are for the years 1919 and 1920 when everything was at the peak. There was some slight reduction for 1921, but the reduction in cost was not in line with the reduced selling prices. Beekeepers will be compelled to greatly reduce costs in order to make a profit at present prices. In many cases, the principal labor cost is that of the owner of the apiaries who gives his own time and takes what is left after expenses are paid.

Frank Rauchfuss, the Secretary of the Colorado Honey Producers Association, figured that at 1920 prices a Colorado beekeeper operating 500 colonies for extracted honey would have $14,000.00 invested in the business. The total expenses of operation, including labor, interest on investment and transportation was $5,476.00. For 500 colonies engaged in comb honey production he figured an investment of $9,262.00 and an operating cost of $4,364.00.

Mr. Rauchfuss shows that with extracted honey at 15 cents per pound the bees would show a loss with an average production of 70 pounds per colony, while with an average crop of 100 pounds per colony the 500 colonies would show a profit of $1,500.00. With comb honey at $5.50 to $7.00 per case, according to grade, an average of 48 pounds per colony would show a profit of $1,448.00.

Since these figures were made, selling prices have greatly declined, and the beekeepers are trying to reduce operating costs to a point which will permit them to sell on the present market and still live.

Profit or Loss.

The public estimates the profits of beekeeping to a great extent on the basis of the dozen colonies in the back yard. These back-lot apiaries occupy what would otherwise be waste space and take only the otherwise idle time of the owner. Whatever crop is secured is largely velvet. During the period of high prices there were frequent editorial comments on the high price of honey. Such usually remarked that the bees were still working for nothing and boarding themselves, and that accordingly the beekeeper must be a profiteer for accepting higher prices for his product.

In 1919, the Dadant apiaries already mentioned produced a crop of 41,800 pounds of honey which sold in barrels at 18 cents per pound. In spite of the high operating costs the bees showed a profit of $3,885.70.

In 1920, on the other hand, the crop was smaller, with costs of production practically the same and the profit was only $135.00. In 1921 the operating costs were still high and the crop small, with the result that the bees showed a material loss.

While the skilled beekeeper does make money during a long series of years, it is through good management and the production of large crops, and not because of light running expenses. The man who is so fortunately situated that he can keep all of his bees in one or two yards operates at greatly reduced costs, and increases his net profits accordingly.

THE EFFECT OF SPRAYING ON BEES.

(By H. F. Wilson, Madison, Wisconsin.)

Since the beginning of the practice of spraying with poisons to destroy insect pests, beekeepers at one time and another have suffered very serious losses by having their bees poisoned. There has been some discussion back and forth among beekeepers and fruit growers as to whether or not bees were poisoned in any great number from spray applied while the trees were in full bloom.

I, myself, have been undecided in this matter but a few cases called to my attention by Wisconsin beekeepers compel me to believe that bees will work on arsenical sprayed trees and do die as a result of feeding on nectar, spray liquid or pollen from sprayed trees.

I am going to cite only one example to show the effect of poison on bees. There are others, but, I think, this one will prove the point. In 1920, Mr. W. A. Price * published the results of a number of experiments carried on by himself which were conducted in a definite and scientic manner giving results which are indisputable. In preparation of the experiments large wire screen cages were built around three apple trees about 12 years old. The ground beneneath the cages was covered with cheese cloth to catch the dead bees as they fell. One tree was sprayed with lime sulfur and arsenate of lead; another was dusted with sulfur and a third was used as a check. Then a colony of bees was placed in each cage. Mr. Price writes, "These three colonies were normal, healthy, colonies with plenty of stores at the beginning of the experiment. The bees were not compelled to work the blossoms for food; and their activities generally were such as would arise from choice." * * * "In front of the hives in the sprayed and dusted trees there were piles of dead bees. This may be explained on the basis of death occurring in the hive and the bodies being carried out by the other workers. There were no dead bees in the hives at the end of the experiment. The spot directly in front of the hive and the floor near the walls contained the large majority of the dead bodies, but the entire floor of the cage was always well littered with dead. Those found directly under the trees probably died on the blossoms and later fell to the floor."

The experiment was started April 30, 1919 and was completed May 15, 1919. At the end of the experiment there were 3, 689 dead and 15,726 live bees or a mortality of 19 per cent in the check cage. In the experiment with the sprayed tree there were 11,627 dead and 7,223 live bees or 69 per cent mortality showing 50 per cent of the bees killed by the poison spray.

*Bulletin 247, Purdue University, Agr. Exp. Station.

In the experiment with the dusted tree there were 4,716 dead and 5,536 live bees, or a mortality of 46 per cent. As there were 19 per cent dead with the check tree, 27 per cent of the bees in this test may be said to have been killed by poison.

These experiments do not take into account the other insects which were undoubtedly killed by the poison. With this evidence at hand, it is quite plain that spraying trees in full bloom reduces the possibility of cross-pollination to a very appreciable degree.

Is It Necessary to Spray Trees in Bloom? Now, that we have shown the value of bees to the fruit grower and the losses which occur when trees are sprayed with poison during the full bloom period; should we spray when the trees are in bloom?

We know that it is necessary to spray against both insects and plant diseases in order to secure good fruit. Experiments carried on at the Wisconsin Experiment Station show that with the possible exception of cherries, it is more desirable to spray tree fruits at some other than the full bloom period. In all spray bulletins sent out from the experiment station, you will find this definite recommendation, *"Never Spray Fruit Trees When Many of the Blossoms are Open."*

THE REARING OF GOOD QUEENS.

(By Allen Latham, Norwichtown, Conn.)

Since the queen is the very soul of the colony it is of the utmost importance that we have good queens. The colony may be queen-right when it has a laying queens, but the colony is not right unless that queen be prolific and yields a progeny energetic and highly characterized with the nectar-gathering instinct.

To rear good queens, therefore, it is imperative that we first have good stock. There is just as much difference in strains of bees as there is in strains of cattle, and it would be as useless to try to rear good queens by use of poor stock as to try to rear a high milk producer by using a non-descript cow bought in the open market. I do not say that it is always necessary to purchase a high-priced breeding queen for a start. Indeed, it is often possible to find in one's own yard a queen which will prove an excellent breeder.

The last statement is never true unless one has in his yard pure stock. Mongrel stock is often excellent in honey production, and the leading colony in a yard is frequently hybrid or mongrel. Such stock is good usually for only one generation, and when queens are reared from the mother of that mongrel colony not one of them will prove equal to the mother, and most of them will prove very inferior. Unless, then, one has some pure stock he should not rear queens until he has procured a purely mated queen mother.

The selection of the queen-mother is a most uncertain matter. Only by trying out a queen can one be perfectly certain that she will throw queen daughters of excellent qualities. It is perfectly possible to pick out several queens in a yard and say of them they are promising breeders, but only trial will tell which of the several is the best. In picking the trial breeder one should consider first of all the purity of the worker bees. They should be uniform. Pass by every colony in which the workers show more than the very slightest lack of uniformity, and if one colony has workers which are as alike as two peas in a pod, note that colony. As a rule a colony with uniform workers will have other good traits. The workers must not be too touchy, yet must be alert and ready to defend the hive. Watch them fly to the field. They must leave with a snappy zip. The guards must run about the entrance, not lazily crawl. Bees as well as people are sometimes lazy. In-breeding will sometimes give a most beautifully uniform bee as to color and markings—also uniform as to lack of energy.

If the workers pass the test, next look at the brood-nest. Select for a breeder only such a queen as has a snug brood-nest. See that there

are solid masses of brood, that the eggs are well placed and mostly pointing the same way. Pass any queen which shows irregular and patchy brood, skipped cells. If you suspect the queen is not at fault and that weather or flow may be responsible for the patchy brood, look again later. Size of brood-nest must be noted. Other things being equal the brood-nest of the prospective breeder must be one of the largest in the yard. We must have prolific stock if we are to get big crops of honey.

You may think that I have dwelt too long upon the matter of selecting the breeder, but I assure you that this is not so. A good breeder may yield good queens under adverse circumstances, but a poor breeder will not give you good queens no matter how carefully you follow all the other details of queen-rearing.

I shall not describe any particular method of rearing queens. Since Henry Alley, of Wenham, Massachusetts, and George Doolittle of Borodino, New York, started the two schools of queen-rearing, there have been a great many off-shoots of these two schools. I mean by the two schools the two well known methods, one that of starting cells on bits of combs in which there are young larvae, and that of grafting cell cups with young larvae. I shall go back of all methods and try to show the underlying essentials of success whatever the method.

The first and all important essential of success in getting good daughters from your selected breeder is to start your cells only when you have your queen-rearing colony at the right stage. You know that we hear of football teams going stale, and we have heard such a remark as this—"If our team could have played this game a week ago victory would have been ours." There comes a time coaches say when a team is at its best. So it is with a colony of bees, there is a time when a colony will take up cell building and carry the cells through to perfection. It will not be easy for me to teach you how to recognize this time, for only by trial and observation can one acquire such knowledge. Rather might I say that it is only by repeated trials that one can come into this knowledge, and I must confess that after years of queen-breeding I still fail occasionally, either through carelessness or indifference. Only when I get word from my patrons is the truth fully impressed upon me. When I get letters stating that the queens I sent were no good I have to sit up and take notice. Queens often appear all right, but the crucial test comes when they are established in colonies —there they must make good. True, some of these queens may have been good, and their failure to make good may have been due to some cause utterly different. But if I send out fifty queens to some ten different persons and get letters from six or eight of those persons stating that the queens were not up to standard, then that means something to me. It is up to me to spot the trouble.

I may be wrong in my diagnosis, but I am fully persuaded that the majority of poor queens sent through the mails are poor because the colonies in which they were reared were not in the exact pitch for the work they were asked to do.

It may not be known to all of you that only a very few bees are needed to rear an excellent queen, 500 bees will rear a splendid queen if the right conditions are present. A colony of 50,000 will in like manner rear 100 queens, and 60,000 will rear 120 good queens simultaneously. I once had 170 cells produced by a colony which at the same time completed 72 sections of honey. The empty sections were given at the time of grafting and were full when the cells were ready to take away. Needless to say that there was a good flow of honey during those ten days. I got something like 100 splendid laying queens from those cells, all so much alike that you could not pick out one and be able to pick her out again if the cages were shuffled. That colony was exactly ready to build those cells.

It is safe to state that a colony, or a lot of bees, is not in condition to rear good queens unless there are a goodly proportion of nurse bees present, nor unless these nurse bees are fat. I mean fat. Bees may not be fat like hogs, but bees are fat and bees are lean, and if you try to rear queens from lean bees you will get lean queens, queens with spindling legs, and a spindling abdomen with a sooty tip, queens which will be superseded in about four weeks.

To get a lot of bees ready for queen-rearing one must feed those bees bountifully. They must have both forms of food, pollen and honey. It is easy to feed syrup as a substitute for honey, but the pollen question is different. Unless one can furnish combs with plenty of fresh pollen it is useless to try to rear queens when pollen cannot be gathered freely. Many a batch of queens turns out poor because the bees cannot get enough pollen. A five day rain will sometimes deplete the supply of pollen in an entire apiary at certain seasons of the year. Such a condition plays havoc with queen-rearing. Therefore, if you rear your own queens select a period when you know that the bees will gather pollen freely. Then feed not only the queen-rearing colony but also the colony containing the breeder for several days previous to starting the cells. Such feeding is not necessary if a fair amount of nectar is coming in. Bees are always fat when both pollen and honey are abundant in the breeding season.

The next step is to get the bees into the right mental state, if I may assume that bees have mentality. Get them hungry for a queen. This necessity is at the bottom of the swarm-box used in the Swarthmore method, where the bees are kept for some five hours on combs that have honey, pollen and water, but no brood. The same condition can be attained on the hive stand without shutting up the bees by taking longer and removing all young brood and eggs. With a host of fat nurse bees, with combs replete with food, with no hungry larvae present to feed, we get the colony into the right state to perfect queen cells.

I find that the best result comes from concentrated work. Crowd the bees. Concentrate the space in which the cells are built. If you use cups, put sixty cups on one frame rather than on three frames. I can easily get 70 cells built in a space represented by my two spread out hands.

Feeding must continue through the period of cell development, but may be stopped as soon as cells are capped if there are plenty of stores in the hive. I like to feed very thin syrup to my breeding colonies, just as thin as the bees will take. Two parts of water to one part of sugar will do much better than a thicker syrup will. In reducing this syrup the bees generate much heat and keep the colony hustling and hot. Feeding thick syrup will not do this. It will tend to cause comb building about the cells and simple storage of the syrup instead of ample heat production.

It is one thing to get good cells, it is another to get good virgin queens. Personally I consider any device in which the virgin emerges into a prison as most questionable. Thousands of queens are ruined by emerging in nursery cages, there to be neglected and half starved. If in a colony, only a few will receive care from the bees, and many will suffer from lack of warmth and proper food. If in an incubator they are liable to suffer from wrong temperature conditions and from improper nourishment. I started in two years or so ago, to use the incubator thinking it would solve one of the most difficult problems the queen-breeder has. Up to that time I seldom had a complaint about the quality of the queens I sent out, but after that time I had frequent complaints, perhaps not frequent, but altogether too occasional to suit my taste. I have had to give up the incubator for that reason. The incubator makes it possible to rear queens more cheaply, but it does not make it possible to rear better queens.

There is only one place for a virgin queen to emerge. That place is right among her foster mothers. This makes her cost more. Well, which wears better as a rule, a $9 pair of shoes or a $3 pair?

Yes it costs more. I wonder if that is not one of the reasons, if not the chief reason, why so many poor queens are mailed every season. But people want cheap queens. They want to pay only 75 cents or a dollar for a queen. I should enjoy buying a nine dollar pair of shoes for $3, but to make certain I generally pay the nine dollars. In buying a queen many will find in the end that it pays to buy the best.

There is no doubt at all that many queens are worthless before they start on their journey, but what of the journey? Some beekeepers go so far as to say that a trip in the mails is practically certain to ruin a queen. I know that this is not so. Almost every queen I ever received from Doolittle lived a long and useful life. I have had queens come from Italy, from Carniola and from Cyprus and live long useful lives. On the other hand I have had queens by the score from our Southern states that did not survive a single season. Yet, I have had some mighty good queens from the South which lived long and useful lives.

No, it is not the trip in itself which is at fault. If the queen is good at the start she will be useles at the close of the trip unless she is well fed on the way. She will be well fed if her attendants are young and the candy is all right.

If the queen mother is properly selected, if the bees concerned in rearing the young queens are in the proper condition, if the queen-

rearing colony is kept up to the right pitch, if the ripe cells are given to bees where the virgins can emerge right among the bees, if the young laying queen is given the right attendant bees, and if the cage is supplied with the right candy—then the queen you receive through the mails may prove a mighty good investment.

Following were some of the questions asked Mr. Latham at the conclusion of his address.

Q. Don't you think the quality of queens has gone up in recent years so as to require a larger brood-chamber?

A. Possibly.

Q. Are your queens better than those raised naturally?

A. Yes, more uniform at least.

Q. I received 20 queens; 17 were introduced the same day. Next day the other three cages were surrounded with little red ants and the queens were dead. Were the ants the cause?

A. Yes, the ants did it.

Q. How long is a queen left in a mating box before being given her liberty?

A. That depends, according to the time the cell is put in. The cell is usually put in in the evening. It is left all night and the next day, release being made the next night so that she can come out on the second morning.

Q. What about controlling the drones?

A. I am not sure of the mating. I can only control a large percentage of the drones by requeening all neighbors' colonies without cost. They are usually willing. Most queens are mated within one hundred yards of the mating box.

Q. Are the mating box bees young?

A. Not necessarily so.

Q. How do you know that most of your queens mate within 100 yards of the mating box?

A. I set out fifty boxes in which the queens are ready to take flight. In an open field 100 yards in front of the apiary there is a ceaseless flight of drones back and forth from one o'clock on. No matter in which direction you go, there are few drones beyond 100 yards from the apiary determining that most of the queens mate within that distance.

Q. The nucleus box has been generally discarded in favor of the larger mating hive. Why do you hold to the small box?

A. A 200 bee box is as good as a mating hive in warm weather with a good honey flow. I am considering abandoning the nucleus box from a point of economy.

Q. Where do you fasten the queen cell in the section?

A. Right close to the upper side of the section, on the frontside, nearest the entrance, with the section close to the entrance in the nucleus.

Q. Isn't there considerable absconding with baby nuclei?

A. I have some, but not much; when the queen is removed within forty-eight hours and there is no brood.

HUBAM CLOVER FOR THE FARMER.

(By Edw. A. Winkler, Joliet, Ill.)

In my former article on Hubam clover I endeavored to give most of the advantages and value of Hubam to the beekeeper.

Now I am going to tell some of the advantages and value of Hubam to the farmer.

It has been thoroughly demonstrated here this year that the principal argument in favor of Hubam against biennial sweet clover is that Hubam can be plowed under successfully in the fall of the same year in which it is seeded in grain, or can be pastured, used for a seed crop, cut for silage or even made into very palatable legume hay ranking very closely to alfalfa, and then plowed under in this same year.

It has been the contending opinion of some agriculturists journals that Hubam has not the large rooting system compared to the biennial.

This year I had one field of 15 acres of Hubam alone broadcast on one side of a fence and on the opposite side were 10 acres of Grundy County biennial. It was very noticeable that the stocks and roots of the Hubam were almost as large as those of the biennial field.

The Grundy County is an early blooming and harvesting type usually cut for seed about July 1st.

Just next to this field on the same kind of soil was eight acres of Hubam in oats. It seems that the rooting of Hubam is larger following grain, the stock being clipped off with the grain and the Hubam having the whole field to itself seems to grow sturdier and with a longer and larger root. The Hubam roots in the oatfield were much larger than those of the biennial.

Hubam here this year seeded with a cover crop on sweet, well inoculated, thoroughly prepared soil and clipped off with the binder when the grain was cut, made even a better growth than Hubam seeded alone, some fields standing up to the shoulders in eight weeks after the clipping at harvest and maturing seed.

It took nerve to begin with seed at $10.00 per pound and at last spread out to more than 1,000 acres of good farm land. But the farmers around here in this county who once turned a deaf ear to the new annual legume are now moved to an inquiry which is likely not to end short of placing Hubam in every part of this county.

The late Dr. C. G. Hopkins of Illinois State University at Urbana, Illinois, emphasized the fact that 6.4 tons of dry sweet clover matter furnish as much humus forming material and as much nitrogen as would be furnished by 25 tons of the average farm manure.

Nitrate nitrogen experiments conducted in 1919 at the State University and printed in Bulletin 233 give the important fact that approximately one ton (water free basis) of spring growth of sweet clover tops (which would be fall growth of Hubam) together with the roots and fall residues, furnished as much nitrate as 19.8 tons of average farm manure.

Sweet clover in the shock near Joliet, Ill.

Hubam planted broadcast yields over 4 tons of dry matter per acre, equal to nearly eighty tons of farm manure, if plowed under.

The following table will show more clearly the advantage of Hubam over all other legumes.

Some of the findings of the Iowa Station are referred to as follows in Iowa circular No. 76:

TABLE I—COMPARATIVE YIELDS OF HUBAM AND OTHER LEGUMES FOLLOWING OATS—1921.

Legume.	Yield (tons per acre).	Av. length plants June 29 (inches).	Av. length plants Oct. 4 (inctes).
Hubam Clover	2.07	25	42
Bi. What. Swt. Clover	1.85	18	22
Bi. Yel. Swt. Clover	1.56	18	22
Alfalfa	1.14	7	19
Medium Red Clover	.95	6	12
Mammot Clover	.92	6	10
Alsike Clover	Poor stand	4	8

*TABLE II—COMPARISON OF NITROGEN RETURNED TO SOIL BY HUBAM AND OTHER LEGUMES.

Pounds water-free material per acre.			Per cent of roots to total weight.	Per cent nitrogen water-free basis.		Lbs. nitrogen per A. water-free basis.		
	Roots	Leaves and stems		Roots.	Leaves and stems.	Roots.	Leaves and stems.	Total.
Hubam	1664.0	3784.0	30.54	2.48	2.43	41.25	91.95	133.20
Bl. Wht.	1451.3	3381.8	30.03	2.86	2.90	41.51	98.07	139.58
Med. Red	827.8	1736.6	32.28	2.29	3.43	18.96	59.57	78.53

*Detailed report of experimental methods used is not included because of lack of space. It has been mimeographed and is available for agronomists and others interested.

TABLE III—ANALYSES OFHUBAM AND BIENNIAL WHITE SWEET CLOVER.

	Per cent protein.	Per cent nitrogen-free extract.	Per cent crude fiber.	Per cent ether extract (crude fat).	Per cent ash.
Hubam Clover	14.32	39.06	33.76	1.79	5.27
Biennial White Sweet Clover	12.94	32.11	38.31	1.16	5.59

Owing to the impracticability of fall plowing biennial sweet clover under, and the necessity of allowing the second year's spring growth to make a large growth before plowing under in order to thoroughly destroy all the plants and eliminate the volunteer trouble which brings plowing close up to corn planting time, Hubam which should be turned under in the fall when the bloom has blown and the seed pods are all green is sure to become the universally used and only real foremost legume adopted to almost all climates and soils.

Owing to its deep rooting system, this legume which gets its nitrogen from the air and deposits it in the soil instead of taking it from the soil, bids fair to become the universal soil builder, and just as fast as we can convince those objectors who still believe sweet clover to be an obnoxious weed and overcome their prejudice against it, arguing that their land is sour and depleted and that they are not getting as large crops as their neighbor who has been planting clovers and crop rotating, just so much sooner we will get our farms back to the fertility they were 100 years ago.

This root was dug up from a field of Hubam sown late last spring alone broadcast, another root was dug up in a field of Hubam following Winter Rye, the root measuring 52 inches. We did not get all of either of the roots.

The opinion that Hubam does not root as large and deep as biennial may never be entirely expelled, but many are taking a different view on this subject after looking at some of the roots that were dug up this fall.

The agitation for the growing of Hubam, the ultimate purpose being soil enrichment, has led men to realize more than ever the necessity of some such legume as Hubam for the maintenance of the fertility of our soils.

Beekeepers should not overlook the advisability of inducing farmers in their locality to plant alsike clover also.

Will County is one of the two counties in this State that together produce approximately 80 per cent of the alsike seed raised in this State. Farmers near my apiaries have harvested as high as $96 per acre of alsike seed.

It is also well to keep in touch with the yields made near your bees in order to inform prospective growers and also if at all possible to furnish bees in that locality to pollinate the bloom, also keep in touch with those who have seed to sell.

Alsike, of course, can not be compared favorably with Hubam as a soil builder on account of its short rooting system, but is of great value as an early honey plant where white clover is scarce.

There is no bloat with Hubam as with alfalfa and other legumes. Stock take to it readily. I had a field of Hubam this year seeded in

oats. After the oats were harvested a good crop of Hubam seed was harvested, and had the farmer wished to cut the Hubam the second time instead of plowing it under, a crop of Hubam hay of approximately 1½ to 2 tons per acre could have been harvested. Such fields will be very rare and are due entirely to the type of soil and early spring planting. This field being planted April 19th.

Many farmers have disked up their Hubam stubble and drilled in winter wheat. Others have drilled it in without disking. Enough Hubam seed had shattered off to insure a thick stand of Hubam following their winter grain next summer.

The following table taken from farmer's Bulletin No. 820 will give some idea as to the valuation of the Hubam straw piles.

The table gives analyses of several samples of sweet-clover silage as compared to corn silage.

Composition of sweet-clover silage and well-matured corn silage.

Kind of silage.	Number of analyses.	Constituents (per cent).					
		Water.	Ash.	Crude protein.	Carbohydrates.		Fat.
					Fiber.	Nitrogen-free extract.	
White sweet clover:							
First year's growth[2]	1	73.7	1.73	3.17	20.8		0.65
First crop, second season[3]	1	73.7	2.57	2.06	8.08	12.32	1.27
Straw[3]	3	73.7	1.19	2.70	13.59	8.33	.50
Corn, well matured[4]	121	73.7	1.70	2.10	6.30	15.40	.80

[2] Analyzed by the Illinois Agricultural Experiment Station. [3] Analyzed by the Bureau of Chemistry.
[4] Analyses compiled by Henry and Morrison.

As shown in the table, the analyses of the first and second years' growth of sweet clover compare favorably in food elements with corn silage. It is to be expected that the silage made from the sweet clover straw would contain less protein and carbohydrates than that made from the entire plants, as most of the leaves shatter from sweet clover before the seed crop is cut.

Next year we will see quite a few farmers cutting Hubam and corn and mixing the two together in their silage.

When this is done approximately two-thirds of the total corn acreage which would be cut for silage may be permitted to mature.

This mixture will make much better silage than corn silage alone.

Beekeepers will do well to write to the Bureau of Documents, Washington, D. C., for all bulletins pertaining to sweet clover such as, sweet clover Utilization No. 820, Growing the Crop No. 797, Nitrate Production No. 233 of University of Illinois, Seed No. 844 and especially Dept. Circular No. 169.

WHAT A COUNTY ASSOCIATION CAN ACCOMPLISH.

(By W. B. Brigham, Bloomington, Ill.)

When I heard that this subject had been assigned to me, I felt that it was indeed a big subject for a beginner, especially when you realize that our own association has been in existence less than a year, and the possibilities of a live County Association are yet far beyond any thing we have experienced. However, we are proud of the results in McLean County, and I shall attempt to discuss this subject by first telling what we have done and how it was accomplished.

Mr. Cary W. Hartman, President of the California State Beekeepers' Association was visiting in Bloomington last December. A newspaper man brought him to our office, stating that they were looking for beekeepers. After calling my friend, Mr. C. H. Robinson, we had a very pleasant interview with Mr. Hartman, who is a wonderful man, not only progressive but very enthusiastic about local organization. After this inspiration and suggestion, Mr. Robinson corresponded with Mr. M. G. Dadant, who supplied the necessary encouragement to proceed at once to organize. A list of beekeepers was obtained. Mr. Dadant promised a speaker for February 17. The Farm Advisor became interested and sent out our notices for a meeting on that date.

Well, there were about fifty persons present, variously interested in beekeeping, an organization was perfected, and twenty signed as charter members. Mr. G. H. Cale, formerly of the Department of Entomology at Washington, D. C., gave a general discussion of beekeeping. Several of the new members expressed their opinions and told interesting experiences. After demonstrating an electric imbedder, the meeting was adjourned.

In the early eighties, an association was formed in McLean County to include Central Illinois, but for lack of interest, it soon ceased to exist. Realizing that the officers, or those in charge of any association are largely responsible for the interest and general results, we congratulated ourselves on securing Mr. C. H. Robinson for Secretary. Mr. Robinson is a busy man, being master mechanic of a big railway and lighting system, and handles bees only as a side line, but being a tireless worker and willing to sacrifice for the good of every member, he has been of real value to us.

In the cooperative purchase of supplies, we were granted a 17 per cent discount. This meant a great saving, as more than twelve hundred dollars was expended by members who availed themselves of this privilege. While I do not consider this as a principal purpose for an organization, it is an item worth considering.

Our first field meet was held at Lilly Orchard, June 2. The weather was ideal, the day was spent in socialibility, exchanging ideas, visiting Mr. Funk's apiary, and fruit farms, and closed with an interesting talk by Mr. C. P. Dadant, who had been busy answering questions since his arrival in the forenoon. Nearly one hundred attended the meeting.

A second meeting was called for July 25 at Mr. J. L. Wolcott's yard in Normal. Mr. E. R. Root was the speaker, and also kindly answered numerous questions. At that time, Mr. Wolcott showed us how he extracts honey. The enthusiasm and attendance were very gratifying. Many new members were secured at these meetings.

At this time, a honey exhibit was put on in the window of a leading grocery store at Bloomington. This attracted sufficient attention to occasionally block the sidewalk. Aside from the interest in the sale of honey, the showing of labels, packages and equipment used by our progressive members was both interesting and instructive.

Back to nature. H. W. Funk, the veteran Illinois beekeeper, opening hives at his Lilly apiary. McLean County Field Meet.

The local interest aroused through our association is manifesting itself in better beekeepers and larger production. As an example: A member, Mr. W. L. Archer, from McLean, states that he believes he has learned more this year than in the twenty years previous in which he has handled bees.

Newspaper representatives attended all meetings, and furnished some excellent articles to the general public.

In response to mailing lists sent by our Secretary, members have received catalogs, sample bee journals, and government bulletins, all of which have their part in the work.

The problem of honey sales has not been thoroughly worked out, however most of our members have largely disposed of their crop at uniform prices. A local wholesale grocer who recently purchased five

thousand pounds of comb honey from a member stated that his observation has been that beekeepers are practically in competition with each other instead of cooperating as in some other lines.

During the season we have doubled our membership, and now have forty members. The annual fee of $1.50 carries affiliation in the State Association.

The McLean Association has gone on record as favoring the placing of a course in beekeeping in our State University, a communication to that effect has been sent to President David Kinley.

Several cases of foulbrood have been taken care of, but there is reason to feel that we should take a more aggressive stand in that matter.

We are now planning a general round-up meeting early in January. The outlook for new members is very good, also the condition of the white clover at this time is indeed promising for a bumper honey crop in 1923.

THE NEW BEEKEEPING.

(By Geo. S. Demuth.)

Within recent years there has sprung up a new type of beekeeping, which is rapidly placing the industry on a much safer basis than heretofore. Not many years ago it began to look as tho commercial beekeeping would be carried on only in the irrigated regions of the west, portions of California, and certain regions on the border of newly settled country where nectar was thot to be unusually abundant year after year. The great clover region of the northeastern part of the United States which was really the cradle of beekeeping, where the old masters worked out the fundamentals of the industry, was thot to be passing as a honey producing region. Recently, however, this region has staged a comeback in honey production and we now find many extensive honey producers in the region formerly thot to be too poor for commercial honey production. Honey is now being shipped in carload lots from localities formerly thot to be suitable only for the amateur who desired to produce a few pounds of honey for his own use in a little apiary of eight or ten colonies. Some say that the seasons are growing better year by year especially in the eastern portion of the United States. So they are for those who have taken up the "new beekeeping," but for those who keep bees in the same old way the seasons are as uncertain as they were twenty to thirty years ago.

What is this that is now creeping over the country, converting poor localities into fair ones and good localities into splendid ones? The answer can be put into two words—better management. During the past decade great strides have been made in management to produce great colony strength at the right time to take advantage of the honey flow. While many factors contribute to the highly desirable condition of nearly every colony in the apiary being abundantly strong at the beginning of the honey flow, the one factor that has brought about the greatest change in this respect is that of leaving more honey with the bees for their own use. By the old method of robbing the bees of most of their honey at the close of the honey flow the bees were compelled to retrench in brood rearing either in late summer and fall when bees for winter should be reared or in the spring when workers for the harvest should be reared.

By the old method of colonies living from hand to mouth at certain times during the year it was only under most favorable conditions that certain especially favored colonies reached great strength in time for the honey flow, but under the careful management of the better beekeepers of today the colonies average much stronger than formerly

and most of them reach greater strength at the beginning of the honey flow than was formerly thot possible. It seems to have taken unnecessarily long for this change to come about, and the industry as a whole still has a long way to go in this respect.

The "new beekeeping" does not leave to chance anything vital to the prosperity of the colonies that can be taken out of the realm of chance. It demands that the preparation for the honey flow begin the preceding July or August and that the colony be normal at that time headed by a good queen, preferably young, and that it has plenty of food. It demands that the colonies be put into as nearly perfect condition as possible for winter even tho the latter part of the season is unfavorable for brood rearing. It demands that each colony be supplied with an abundance of stores at the beginning of winter, and in the north where bees are confined to their hives for long periods, that the winter stores be of the best quality. It demands that these conditions be in all colonies at the beginning of winter and not in some of them as has too often been the case. While colonies that have been supplied with favorable conditions during the late summer and autumn and are supplied with an abundance of wholesome food at the beginning of winter are hard to kill by winter exposure, the "new beekeeping" provides adequate winter protection for the severest winter each year instead of for the average winter of the locality. In this way instead of taking a chance that the winter shall be mild the beekeeper insures himself against loss by providing for the worst every year. While it might not be necessary to take all the precautions as to late summer, fall and winter requirements more than two years out of five, beekeepers are finding that it pays handsomely to provide for the worst winter every year in order to prevent loss during the severe winters.

In the spring the "new beekeeping" demands that every colony be given every opportunity to build up quickly to the greatest possible strength for the honey flow. When Doolittle pointed out the value of "millions of honey at our house" for this building-up period, together with an abundance of room in the form of good worker combs for brood rearing he pointed the way for "the new beekeeping." This "new beekeeping" takes no chances on nature furnishing enough food during this critical time, but every colony is supplied with a large reserve of honey, often as much as 40 to 50 pounds. Formerly there was a saying among beekeepers especially in the clover region that when the early flowers such as fruit bloom yield well, clover may be expected to yield well also. Thus it was thot possible to predict the character of the yield from clover by the character of yield from the early flowers. There was supposed to be some mysterious connection between the amount of nectar secured from the early flowers and the crop that might be expected from clover. This mysterious connection has all been explained since beekeepers have learned that good yields from clover are often secured when the early flowers fail to yield. The connection between these two things was only in the supplying of a great abundance of food from the early flowers that permitted the colonies to build up to enormous

strength by the beginning of the clover honey flow. In other words, beekeepers have learned to bring about practically the same results by leaving an abundance of honey in the hives for this critical brood rearing period.

Of all things which help to bring about uniformly strong colonies at the beginning of the honey flow and therefore help bring success in honey production, the big and outstanding factor is a great abundance of reserve stores, especially in the spring when workers are being reared for the harvest. Those who provide each colony with a food chamber filled with honey during this critical building-up period in the spring and permit the queen free range thru both stories, are reaping rich rewards for doing so. In many localities this food chamber with "millions of honey at our house" converts poor locations into good ones and practically eliminates poor seasons in ordinary localities. "The new beekeeping" is based largely upon this safety device. The food chamber together with the slogan "millions of honey at our house," is now working miracles in honey production. If every beekeeper in the country would leave forty or fifty pounds of honey in the hive at the end of the season, whether this be left within a large brood chamber or be left in a food chamber which can be filled with the best early gathered honey, the yield of surplus honey would increase by leaps and bounds. The stimulation to early brood rearing resulting from the presence of a large amount of stores is almost as great as that of nectar and pollen coming from the flowers. This plan of stimulating brood rearing is especially applicable to the clover regions. The presence of a large amount of honey in the hive does not always stimulate heavy brood rearing, but it does so in the months of May here in the clover region, and that is exactly the time that brood rearing should be stimulated to the utmost.

In addition to leaving more honey for the bees at all times, beekeepers have learned within the past twenty years how to control swarming almost completely, so that out-apiaries can be operated without an attendant in each yard during the swarming season. In working out swarm control plans, much has also been learned in regard to inducing the bees to work with the greatest possible energy during the short time that the flowers are in bloom.

INCREASED EFFICIENCY OF PRODUCTION.

(By F. B. Paddock, Ames, Iowa.)

The problem expressed in the title should not be new to beekeepers, for we find Alexander saying, "Do not spend any time worrying over the frequency of poor seasons, but spend your time in preparing your bees to make the most they can of any kind of season that comes, then you will be almost surprised to see how few poor seasons there are. We have not had a really poor season in twenty-five years, while some of my neighbors complain of a poor season nearly every summer." The excuse then for this discussion is found in the need of bringing to the attention of the beekeeper, the necessity of practices which will increase their production. Again we find Alexander saying, "Far too many beekeepers think that the value of their apiaries consists in the number of colonies they keep."

No doubt there are many who feel that this is no time to consider the production of more pounds of honey in the United States. We hear on almost every hand the plea that increased production will reduce prices. In that connection, it is interesting to note that in a recent speech, Dr. E. D. Ball, Director of Scientific Research of the United States Department of Agriculture, says: "Food production of the nation has not been keeping pace with the population for nearly two decades, and if the same ratio continues for an equal length of time, the nation will not be on a self-sustaining basis. Increase in production may be brought about by bringing up the methods of the poorer producers to those of the better ones. Increases in the possibility of production of food can be brought about only by developing better plants and animals, better soils, and better methods, and by the removal of pests and diseases."

Figures are always interesting, for it is possible to prove almost anything by statistics. The crop report for 1922 contains some very interesting data for the beekeeper of Illinois. We find that while Illinois produces only 5 per cent of the surplus honey crop of the United States, it does tie with New York, Iowa and Texas for second place among the States. It is very interesting to note that for the period of 1913-20, the average yield per colony in Illinois was forty-six pounds. In the year of 1921 only forty-six pounds were produced by each colony, and in 1922 the production per colony was seventy-eight pounds. The most careful statistics compiled in the last year or two indicated that seventy pounds of honey must be produced in order to secure reasonable returns on the investment. We see then that there

is a problem confronting the production of honey in Illinois. These statistics further show that there has been a slight decrease in the production of comb honey since 1914, with a relatively less increase in the extracted, but a relatively large increase in the production of bulk comb honey. Conditions should be very favorable for honey production in Illinois, as the figures indicate a large home consumption, since only 16 per cent of the honey produced is shipped outside of the State.

In casting about for factors which might be considered in any campaign for increased efficiency of production, we might mention disease control, winter loss, swarm control, and better stock. While it might not be wise to say that the brood diseases are widely spread in Illinois, yet there is little doubt but that loss by disease over the State is very considerable. It is exceedingly difficult to put this loss in a statement containing dollars and cents, but one can readily conceive of a large total as the result of the presence of disease. As in every State, the beekeepers of Illinois need more assistance in an effort to eradicate contagious diseases among bees. There will be few who will question the accuracy of this statement that thousands of dollars are lost every year through the ravages of disease.

In the matter of winter loss, it is possible to make a more definite statement. Statistics show that during the five-year period of 1914-19, the winter loss in Illinois was reported to be 11 per cent. In the year 1920-1921 this loss was reported 5 per cent and in 1921-1922 it was reported 12 per cent. Here then is a loss which can be reduced by more improved management and must be reduced before honey can be produced efficiently. There is no business today which can succeed with even the annual loss suffered by the beekeeper in wintering, which means one colony out of every ten. In the possible improvement of management looking toward the reduction of this tremenduous winter loss, we have three possible factors. These are the introduction of new queens, the provision of ample stores, and plenty of protection.

There may be localities where conditions make it advisable not to fall requeen, but it is necessary to determine that this practice should not be followed rather than not to attempt it. In general over the United States, so much good has resulted from introducing new queens in colonies in the fall that it has become the rule rather than the exception. The exact time to requeen must depend upon local conditions. As has been advised by Dr. Phillips, the new queen must be in operation in the hive at least six weeks before the cessation of the fall honey flow. If the honey flow is available so as to permit this, then the practice is excellent. There are probably some local conditions where the fall flow is not dependable and under these conditions the new queen should be introduced during the last week of the summer flow. Experiments have been conducted which show very conclusively that a colony headed by a new queen goes into the winter much better prepared than the colony with the old queen, or even with the spring introduced queen.

In the matter of stores, the information which has been given to us, is nine pounds of honey for every pound of bees in the colony, and

an additional fifteen pounds as an insurance policy against disaster. In the normal colony this means that sixty pounds of honey must be provided at the beginning of the winter period. In experiments which have been conducted by Park at Iowa Station, the actual consumption has been found to average fifty-two pounds. It is very evident then that the sixty pounds given as a theoretical estimate is hardly sufficient.

That so many beekeepers should fail to appreciate the need of protection is beyond comprehension. Probably every other form of live stock is given reasonable consideration during the cold period of the year. That the winter loss is not larger than it is, is a matter of marvel. Either cellar wintering or outdoor protection in the form of packing cases will give excellent results, depending upon the locality. It would not be wise to advocate one method to the exclusion of the other.

The success of the beekeeper is no longer measured by the number of swarms which his colony has. It is taking a long time for this idea to disappear. Yet there are many beekeepers who experience a thrill when a swarm issues from one of their colonies. That honey production could be cut in half by the swarming problem has been determined. Why is it not best then to practice every means which will reduce swarming? Here again we find a factor which cannot be reduced to figures, and it is to be regretted that this condition exists, for the intangible result is very difficult for the average beekeeper to appreciate. One must study local conditions and govern their operations accordingly. For the Standard Langstroth hive, the Demaree method has been given as a panacea for the swarm control problem. Mr. Park, in his investigations at the Iowa Station has found that there is danger in the over-use of this method. In his conclusion he says "conditions necessary to insure a maximum crop when using the Demaree method of swarm control are: First, the honey flow lasting at least four weeks. Second, colony strong enough at the beginning of the flow to absorb the shock of the treatment." Methods which may prove satisfactory in one locality will not necessarily be satisfactory in another locality. The large hive has been listed by some as a means to reduced swarming. This method may prove satisfactory in many localities.

Perhaps the most important factor in increasing the efficiency of production is the securing of better queens. The low production which is prevalent in every yard, as is evident by the uneven returns per colony, indicates that the queen which the beekeeper is now getting comes from an indifferent producing stock. In experiments conducted by the writer, it was found that the loss caused by every queen which produced less than the average per yard, was $18.00 each for a single season. Even if we were forced to pay more for our queens and were assured of a better standard, it would certainly be a paying investment. We have learned in other lines of production through the Babcock test that there are boarder cows in most every herd, and through the trap nest, we have found that most every flock contains boarder hens. In spite of this, the beekeeper is content with indifferent production by queens in the yard. The following deductions were made as the result of these experiments: First, there is too much loss in queen intro-

duction. Second, there is too much replacement necessary. Third, there is too low a proportion of good replacement. Fourth, the cost of good replacement is very high. In the matter of stock improvement, it must be necessary to consider the record of performance of the parent before we can expect any performance of the offspring. It is not necessary to depend upon the purchase of queens for stock improvement. Many of our most successful beekeepers have learned to rear their own queens. These, of course, are reared from the highest producing colony and after a series of such selection, it is possible to secure quite a satisfactory result in the matter of production from home reared queens.

The matter of stock improvement may not necessarily depend upon a single selection or a race of bees. In Switzerland we know that very successful efforts are being made to improve their stock by selection and by mating through the establishment of mating stations high in the Alps mountains. In Great Britain the same bee may not necessarily give the best results, so we find that the beekeepers there have stations on one of the Shetland Islands where they can breed a strain of bees best fitted for conditions in Great Britain. Why should the beekeepers of the United States expect to secure maximum results from a strain of bees developed under a series of conditions absolutely foreign to the conditions under which they are expected to work? In this connection it is interesting to note that the Colorado beekeepers, in cooperation with their experiment station, contemplate the establishment of a queen mating station in isolated spots in the mountains. The purpose of this work is to evolve a strain of bees best suited for their climatic conditions.

Is it not possible then to readily understand why honey production today is so expensive with the present inefficient methods employed? The solution of this problem rests in the hands of the beekeeper. The responsibility cannot be shifted to some unknown party. The problem is not one of price of honey, but of the pounds which can be produced at the present investment.

HONEY SANDWICHES.

(By Allen Latham, Norwichtown, Conn.)

The making of honey sandwiches and the development of this product as well as the selling of honey at fairs has been a gradual evolution with me. I can only give final results and my procedure now.

I go the rounds of fairs in a truck carrying an army cot and other material with me.

The honey sandwiches are made of best quality of roll and comb honey. I have special rolls made, insisting that each pan of rolls be made up of 5 dozen Frankfurt rolls, one dozen in each row, or 6 rows of 10 each. I ask the baker to flatten these, using 12 to 14 ounces of dough. The same weights are used always and it makes a fairly generous portion.

These rolls are sliced laterally and opened and a slice of the comb honey is put on the bottom piece. Eight or ten slices of this comb honey can be gotten out of each section, according to the weight of the section. The honey sandwich business was nearly killed in some instances by stinginess with the amount of honey given.

I have sold as high as 400 to 500 dozen of these sandwiches at one fair.

I am equipped to furnish hot coffee at 5 cents a cup next year. I use paper cups with metal holders.

In order to get demand for these rolls it is necessary to teach their value at first. At the Hartford Fair I am now selling as high as 300 dozen rolls a day, whereas at first it was very difficult to sell 100 dozen. I have sold as high as 1,500 of these honey sandwiches in one and one-half hours.

The sandwiches net about 3 cents each or, in other words, each 10 ounce section of honey nets me in the neighborhood of 75 cents. I have been very successful and feel sure that others can do likewise.

WHY OUR ASSOCIATION HAS SUCCEEDED.

(Elmer Kommer, Woodhull, Ill.)

There are several things which have helped make Henry County Honey Producers Association a success, one of them is the splendid interest the members have taken in it since we organized.

The beekeepers in our county realized that we needed an association, but it took a year before we could get together and organize, and then we were only able to organize with thirteen members, but those members were composed of the most interested beekeepers and proved to be real live members for our association.

The Henry County beekeepers are boosters. A typical County bee meeting.

When we organized we all agreed that all members should serve on the membership committee, and as the result we gathered in 28 members for the first year.

We held our first field meeting at the apiary of P. A. Carlson of Galva, Ill., in June, 1921. This meeting was well attended, so we decided to hold another meeting in September. This was held in the apiary of Howard Wilson of Geneseo, Ill.

At the county fair in 1921 the Farm Bureau invited us to place an exhibit in their tent, which we accepted. This exhibit consisted of extractor, hives, supers, frames full of foundation, and two observation hives. One had the black bees and the other had the 3-band Italians with queen. We found ourselves busy answering questions all through fair week. We also got a few members for our association.

We held another exhibit at the Osco Grange fair, and one was held at the Farmers Institute in Geneseo later in the season. All proved a success and helped advertise our association.

This year we decided that we would affiliate with the Illinois State Beekeepers' Association and have found the monthly news letters very valuable to our members; they are worth many times the affiliation fee, and we recommend that they be continued. The annual report is also appreciated by all of us.

Before we were organized in this county the honey premiums at the county fair amounted to only $1.50. This we decided was not enough to pay us to show our honey, so a committee was appointed to meet with the fair board to see about getting them to allow larger premiums for this year, for products from the apiary. This the fair board considered and the premium list amounted to almost $25.00 and, besides, we were allotted a space of 16 feet wide in the floral hall for an educational exhibit. This was similar to the one we had in the Farm Bureau tent the year before, but much larger. This, of course, could not have been had if there was no organization. We ordered some honey leaflets that we gave out at the fair which advertized Henry County honey.

We held two more field meetings this year. One was at the apiary of A. B. Fessler, Cambridge, and the other one was held at the apiary of Ed Kommer, Andover. The last one proved to be the best one we have ever held.

This fall we have done some inspection work in our county and have found quiet a few cases of both American and European foul brood scattered through the county, and the beekeepers have wakened to the fact that there need be a general cleaning up next year.

The Illinois State Beekeepers' Association has been very valuable to us and our association since we affiliated with them as well as before.

We have called on them to furnish speakers at our field meetings, which they have done in every case, and have sent the best that could be sent and we have received some very valuable information from these speakers at these meetings. We plan on having at least two more field meetings in our county next year. The first will be held in the apiary of Edward Lehman, of Hooppole, some time in June.

Through the Secretary of our association we have been able to secure some attractive discounts on bee supplies, bee journals, queen bees, as well as package bees for our members, and there is hardly a member but what has saved more than what it has cost him to belong to our association.

There are no county associations in any of our neighboring counties, *but talk has been to get* both Bureau and Knox County organized,

but up until now no action has been taken. If these counties organize it will be of benefit to us, as we can attend their field meetings, as the field meetings are of great help to beekeepers. Those that want to give their bees a little attention can get some valuable information that will help them to secure a better crop of honey, and I have known some that have given up beekeeping entirely, as they have found that there is more work in connection with beekeeping than they want to do in order to get a good crop and, besides, they haven't the time to spare for bees just when they want it.

In conclusion I think that in order to make a good live association that there must be a series of field meetings, for they are the best line of information that the county associations can get. It also gives the beekeepers a chance to exchange their own experiences which, when brought together, will lead to better beekeeping.

WAX SECRETION.

(By C. P. Dadant, Hamilton, Ill.)

That beeswax is a secretion of the bees and not a product gathered in the fields has been known for over 150 years, and yet there are many people who still think that the little pellets of yellow substance which the bees gather and bring home upon their legs, in what are called "pollen-baskets" are pure beeswax. We are told that the method of production of wax was discovered as early as 1765, in Hanover. But it was not until 1793 that Huber made his remarkable experiments concerning the production of wax from honey, although, in his second volume he mentions the discovery as made by others some 30 years previously.

However, there was so much doubt concerning these discoveries and the change of honey into wax looked so very unlikely that, in 1815, Robert Huish, an English writer, in his "Treatise on the Management of Bees," saw fit to ridicule Huber and his experiments. When I read a work of this kind, I wonder how many of our so-called scientific works contain as many errors as Huish managed to cram into the 400 odd pages of his book.

Huber made and repeated a number of experiments upon the uses of pollen and honey. Confining bees to the hive with pollen, he found that they would not build combs, but did feed the brood. On the other hand, when he confined bees with plenty of honey or syrup, but no pollen, he ascertained that they were unable to rear brood but could produce wax.

As to the quantity of wax which is produced from a certain amount of honey, no uniform results have been obtained. This comes from the different conditions in which the bees find themselves that are induced to produce wax.

It is now well known that the wax producing organs are located on the underside of the abdomen, four on each side.

When the bees remain with their stomach loaded with honey, for some time, the production of wax appears to come in a natural way. It is neither the young bees, just emerged from the cell, nor the old field bees, which secrete the most wax, but the full grown workers which have the function of taking the load from the field bees when they come home from the harvest. People have often wondered at the division of labor in the hive. They thought, as did Huber, that some bees were predestinated only for the nursing of the brood, others for the production of wax, others still for field work. Although Huber carefully marked a number of workers and found them to be following

a certain part of the labors of the hive, he did not follow them long enough to ascertain that their labor changed with their age. It was only when Italian bees were introduced into colonies of common bees, that the succession of labors was ascertained. Perhaps the best early tests of this kind were made by Dr. Donhoff, of Germany, in 1855.

As I have stated before, the cost of comb to the bees is irregular. It has been estimated at from 2 pounds of honey up to 20 pounds and more for one pound of wax. The experimenters who held that a pound of comb could be built from two pounds of honey did nt take into account the quantity of wax already existing in the wax organs of the workers when testing their weight. On the other hand, those who, like Huber, made tests on bees in confinement could not possibly succeed in getting the most economical results. The production of wax from honey, by digestion, is very much like the production of fat, or cream, or butter, from our farm animals. It changes according to the more or less favorable circumstances in which the animal finds itself.

That wax is very expensive to bees is readily ascertained when we make artificial divisions of colonies of bees; because the bees in those divisions are taken as found, without a load of honey in their abdomen and without wax already produced in their wax organs.

The speedy production of wax takes place when a colony becomes crowded for room, at the beginning of a good harvest. The weather may have been unfavorable, though there are many blossoms in the field. Then suddenly the blossoms begin to yield honey. Every worker-bee coming home from the field is loaded with nectar. The cells of the brood chamber are soon filled, the young bees soon have all they can carry in their honeysack. In 24 hours, some of the wax scales produced begin to exude from the rings of the abdomen of the workers. If the crop continues plentiful, all the bees produce more or less wax because all the bees are constantly filled with honey. It is then that, if the colony swarms, the production of wax seems to be inexpensive; yet if the bees had been supplied with empty combs in plenty, the profit would certainly be greater than can be secured from this wax production.

Attempts have been made, in countries where honey is of low grade and cheap, to have it used for the production of wax. A few years ago, a Chilean, writing in one of the European bee magazines, described his wax production and stated that he figured the cost of a pound of wax to be about 7 to 8 pounds of honey. But the great difficulty, in such wax production, is to keep the bees building without lessening their power of reproduction. Since wax represents the "house-furniture" of the beehive and bees can neither store honey nor rear young without it, it is contrary to the success of the colony to deprive it of its combs. In fact, it is impossible to remove combs without at the same time removing some of the brood or some of the honey; for bees will not build comb unless it is needed for either of these purposes.

Although we never made experiments upon the production of wax, such as to enable us to state positively what we consider the average amount of honey necessary to produce a pound of comb, yet our ex-

periences in having worker combs built, before the existence of comb foundation machinery, gave us evidence of the great cost of wax.

We were in the habit of buying up worker combs from box hive beekeepers, every spring, after the winter losses had been ascertained. The average bee owner did not figure that empty combs, in April or May, were worth anything, because he knew that the moths would do away with them; so we had no trouble in buying all we could find, using them in movable frames to increase the number of combs in our divisions of the previous year.

But we could never find as many combs to buy as we wanted, and allowing the bees to build at swarming time was not desirable, especially as about one-eighth of the comb thus built was drone comb. So, in the spring, when our colonies were strong and still rich in stores, we would remove one comb from the center of a strong colony, using it for a weaker one, and would supply that strong colony with an empty frame, with only narrow guides. Now, if a pound of wax cost only two to seven pounds of honey, as one comb weighs only about one-fourth pound, it would have required only from a half pound to less than two pounds to rebuild the comb removed. Instead of that, it took so much honey that the bees hesitated to secrete wax at all and used such makeshifts as removing parcels of wax from old combs standing in the sun or even from parts of the hive where they appeared not to be needed, in order to fill the gap made by us. So the combs thus built, at unnatural times, were not white, but dark; it was very easy to see that they were built almost entirely of old wax. They were always worker combs.

Since that time (some fifty years ago), I have often noticed that bees remove wax from places where it does not seem to be required, to use it in other spots. Comb foundation, placed in remote parts of the hive, will be gnawed by the bees until the apiarist wonders whether they are not trying to get rid of it. Yet, if he investigates, he will find that none of the missing wax has been thrown away, but is used where it is thought by the bees to be more necessary.

Mr. A. C. Miller, of Rhode Island, made the statement that bees often cut the combs near the entrance to such an extent as to leave an empty space, which is later refilled by them with drone comb. That is correct. The bees appear to see no need for comb near the entrance, when the weather is cool, and so cut it down to use the pieces elsewhere. When the warm season comes again, they rebuild this, often with drone cells. This explains why Doolittle and others believed that bees would tear down worker comb to rebuild drone comb. However, they do not do this purposely, and such things are only accidental, with other aims in view.

I wish to speak of one more question regarding the secretion of wax and the supplying of already built combs. Men have asserted that bees *must* build combs, and that when they do not find a place for the use of this wax, they waste it. I am sure that this is an error. Bees secrete wax only when they must remain loaded with honey. If there are empty combs in the hive, to discharge the contents of their honey

sacs, so they do not have to remain loaded, the production of wax is very limited, barely enough to lengthen out the combs that have been cut down during the winter consumption, enough to *whiten* the cells, as the practical beekeeper calls it.

The quantity of comb necessary to fill a hive with all the "furniture" that it needs is very limited, about two pounds in a ten frame body. Messrs. Foloppe Brothers, of France, made some experiments on different weights of foundation; these experiments were recorded in the American Bee Journal for May and June 1911, as translated from articles in L'Apiculteur. These experimenters, by coloring the wax of which they made foundation, were enabled to ascertain that the entire comb was built by the bees from the sheet of foundation, if the weight of the sheet was not less than at the rate of six sheets, standard size, to the pound. Anything lighter than that compelled the bees to produce additional wax for comb building. Since that time, we have advised beekeepers not to use foundation lighter than 6 sheets to the pound, for brood combs, if they wish to economize on the labor of the bees. But the tendency to economy, in the dollars and cents invested, has led beekeepers to demand about 7 sheets Langstroth size, to the pound, which compels the bees to use about half a pound of wax of their own production to finish out the combs of a hive.

In order to convince the doubting ones that there is no loss of wax in a colony whose combs are already built, I will ask them, at the time of swarming, to examine both colonies that build their own combs and colonies whose combs were built beforehand. They will find more wasted wax on the floor of the former than in the latter. The reason is that, when bees build combs, there are always a number of scales of it that fall to the floor. The less they secrete, the less is wasted. But the only time when there is an actual and very positive waste of wax is when they cut the cappings of the cells, in winter, to consume the honey. At that time, it is out of the question for them to put it to use, and it is swept out of the hive.

It may also be well to add that Italian bees are much more likely to save, on wasted wax, than common bees. If you have a few hives of Italian bees in an apiary of common bees, you will notice more Italians than blacks, working on old combs in the sun, in early spring. We also found that Italians would rebuild removed combs quicker, all other things being equal, when there is nothing in the field for them to harvest.

My conclusions are that wax secretion is not a profitable thing to the apiarist, all things considered, as long as wax is not worth ten times as much as honey in a commercial way. We will continue to return wax to the bees in good straight worker combs removing all drone combs, except in such hives as may be wanted for breeders.

IS THE LARGE HIVE A DANGEROUS FAD?

(By E. R. Root, Medina, Ohio.)

That there have been expensive as well as dangerous fads in beekeeping, history shows. We older beekeepers remember the folly of reversible frames; of excessive contraction for comb honey; of reversible hives; then, later, the divisible-brood-chamber hive that came near wiping out beekeeping in some localities; how all of these fads were exploited in the early '80's and '90's; and how many beekeepers all over the land invested their money in some of them, only to find, later on, that they were not only dangerous fads but that their crops of honey were growing less and less.

The question might arise here, "Is the large hive which is now receiving so much attention a passing fad or even a dangerous one? Is it liable to be an expensive blunder like the double-brood-chamber hive of the '80's and '90's?"

I myself in times past, and in the A B C and X Y Z of bee culture, have said too much in favor of big brood-chambers to turn about face and now condemn them. No, sir. The man who would condemn the large hive is either prejudiced or an ignoramus. That some who adopted it were bound to be disappointed, there can be no doubt; that there are others who have tried it and like it is equally true. If so, we may conclude that, while the large hive is not a fad nor even a dangerous one, it has its limitations—that is, it is adapted to some localities under some conditions, and yet is not adapted to other localities under other conditions. In order that we may consider this question intelligently and impartially, let us first discuss, as impartially as possible, some of the advantages of the large hives, and then, later, discuss some of their disadvantages.

Arguments in Favor of the Large Hive.

No one would argue today that the ten-frame Langstroth, with combs built from an ordinary foundation that will stretch enough to leave two inches of honey next to the top-bar, is large enough to accommodate the egg-laying capacity of a good queen. Practically all beekeepers are now agreed that, if the Langstroth hive is used, an additional hive-body or super should be given to the colony for a certain period of the breeding season, and that, later on, this same breeding should be confined to one story. This, then, naturally brings up the job of shifting the queen from the upper to the lower story. While the queen goes up readily, she is not inclined to go back in the lower

story. It is right here that the apiarist must take a hand in the procedure. All of this involves a little extra labor and the use of additional appliances; and if one uses the large hive he will be saving this labor because the queen will have room enough in the one brood-chamber.

It has also been argued that, in a larger brood-chamber where the queen has plenty of room, the bees are less inclined to swarm; and this is one of the strong arguments in favor of the big brood-nest, as there are many people who do not know how to control swarming with the standard hive. To get the maximum amount of brood in a double brood-chamber requires some experience and a knowledge of the locality. If, therefore, one does not have this, would it not be better and safer for him to adopt a large brood-nest that will take care of itself?

Again, the advocates of the large brood-chamber, or at least some of them, say they do not need any queen-excluders—that so far as lifting is concerned they handle only shallow supers or shallow extracting-combs.

It is argued again that a queen will lay better in a large frame where she can expand her circle of egg-laying than in a relatively shallow frame like the Langstroth. Not much doubt about that.

It is also claimed that a queen, unless forced up by the apiarist on the Demaree plan, does not readily pass the line of honey, top-bars, bee-space, and bottom-bars into the upper story—that when she does so of her own free will she is inclined thereafter to stay upstairs and desert the lower story. That is also true.

Again, if one belongs to the class that does not know when and how to manipulate a double brood-nest of Langstroth dimensions, and that class made up of farmers and backlotters represent the majority of beekeepers, should not all such adopt the large brood-nest? Or, to put it another way, would not the average small beekeeper succeed better with a large brood-nest? To be frank, I am not so sure that he would not.

So far the argument in favor of a large brood-nest, briefly summed up, is that it saves extra manipulation, requires less skill in management, allows the queen to expand her work naturally, saves the cost of queen-excluders, tends to reduce swarming, and is better for the average beekeepers who constitute the largest class. There is some truth in all of these statements, particularly for some localities and for small beekeepers of a limited experience, or the professional man who can not give more time to his bees.

Argument Against the Large Hive.

Let us now look at the other side—some of the disadvantages of the large brood-nest: 1. It costs more per unit. 2. It is not standard, in some cases requiring special bottom-boards, special covers, in all cases extra-depth hive-bodies and extra-depth brood-frames, and a special size of comb fundation. This brings about not only complication but expense. 3. It is not readily adapted to the production of comb honey, like the regular standard equipment. During war time, when every-

thing seemed to be going over to the production of extracted honey (a condition that does not now exist), the large hive seemed to have a big boost in popular favor; but now that extracted honey is relatively low in price, and comb honey is relatively high, there is a strong tendency to go back to the production of comb honey. The big hive is too deep for the production of comb honey to advantage. 4. A large brood-nest adapted more to the needs of those who produce extracted honey must necessarily use a shallower super and frame, because the large brood-chamber depth is not suitable for the extractor. This means extra equipment. 5. The large brood-chamber is unwieldy to handle; and it is, therefore, not adapted to use of women or men who are not capable of lifting heavy weights. 6. The regular standard equipment of ten-frame Langstroth is just right for the production either of comb honey or extracted honey, whichever the market seems to demand for the time being. For the production of extracted honey only, there need be but one unit of frames, hive-body, or super. Supers or brood-nests, and frames that are interchangeable, not only save in first cost but are a great convenience to the apiarist. 7. Regular Langstroth equipment, if one for any reason wishes to go out of the business, will find a more ready market at a fair price because it is standard than something that is special or irregular. 8. The advent of the new sag-proof reinforced foundations now offered for sale may so materially increase the breeding capacity of a standard Langstroth ten-frame brood-chamber with a food-chamber on top that a large brood-nest may not be needed. Time will tell. 9. There is more attention being given now to the breeding of better queens than ever. Some queens have reached the capacity of twenty Langstroth frames. If *some* queens can reach this maximum for one time, it is not possible by scientific breeding and selection to get more of them? Already there are not a few good queens that exceed the capacity of some of the big hives or brood-nests now on the market; but there are none that go beyond the capacity of a two-story ten-frame Langstroth equipment. If we are to have better and more prolific queens in the future, will the big hive be big enough for such queens? One thing is sure—the standard equipment would meet the situation. 10. Since it is only during a few weeks in the spring that the best of queens will fill more than a standard ten-frame Langstroth broad-chamber, many beekeepers prefer to let the bees expand the brood into an extracting-super during the peak of brood-rearing rather than have a larger brood-chamber only partly filled with brood at the beginning of the honey-flow. Bees enter the supers more readily, and work in them more vigorously, when the brood-chamber is crowded with brood.

Such, in brief, are the arguments in favor of small against the large hive. I stated at the outset that the large hive is adapted to the use of some people, especially those in localities where the seasons are long, and where honey in the liquid form is produced. In average northern localities, especially where alfalfa and white clover are produced, I believe that the regular standard Langstroth is to be preferred—Not only because it is cheaper, but because, by proper manipulation by the

person who ought to know his business, he can regulate brood-rearing, keep swarming under reasonable control, and at the same time he can produce either comb or extracted honey at will. Moreover, in some localities it is desirable to restrict the queen's egg-laying activities by confining her down to a brood-nest of limited capacity, after the main part of the breeding season is over. Such restriction will reduce the consuming force, after the season is over, down to a minimum rather than have on hand a large force of workers that are only consumers, and which will die off before fall comes on, but not till after they have eaten a large amount of stores. Right here I might emphasize again that the strongest argument for standard equipment is that it is adapted for either comb or extracted honey. At the present time comb honey is scarce, and extracted honey is of slow sale, with prices tending to sag. In a word, the standard hive will adapt itself to more conditions and localities than the large hive.

Any one who is thinking of adopting the large hive should try a few first; and if the trial then is satisfactory, increase the number for another season.

As a rule, if the beekeeper finds he has from 200 to 300 colonies he had better stick to what he already has, whether it be a large or a small hive. He can make money with either one of them. *Don't*—don't—throw away old equipment.

To answer the question in the title, I would say that the large hive is not a fad nor a dangerous piece of equipment. The agitation in favor of a large brood-nest indicates a healthy and a good symptom. Whether that brood-nest shall be in a single or double unit will depend on conditions. The average person should keep an open mind, study his locality, and then make the decision himself after having tried the large hive on a limited scale.

HONEY CANDIES AND THEIR MAKING.

(By Allen Latham, Norwichtown, Conn.)

Honey is used in making many of our best candies and can be used in making simpler candies within the scope of the members of the family of almost any beekeeper. Nougat and certain other rich confections are rather difficult for the beginner in candy making and I shall not talk about such. In the first place I have no first hand knowledge and in the second place do not think it would be productive of much good. I will instead tell you of candies I have made myself and which with a little practice anyone of you can make.

There are three forms of confections well within the reach of anyone of ordinary skill. These three are chocolate-coated candied honey, chocolate-coated comb honey, and a pulled candy in which the chief ingredient is honey.

To make a high grade of the first mentioned candy one must have a high grade of candied honey. Honey coarsely grained will not do. Any sandy character will kill the candy. The honey must be of velvety smoothness, must be what I term honey-butter. This should be prepared at the approach of cold weather. Use only a well-ripened honey and stir it once or twice slightly each day until it begins to thicken. When it has reached a heavy cream stage pour it into a proper receptacle. I find a shallow square cake tin suitable, but if much candy is to be made it will pay to make a form as follows:

Cut out two boards four inches wide and eight long, and two four inches wide and three feet long. Screw the longer ones to the shorter ones. Now cut a board three feet long and about ten inches wide and screw this to the box made by the others. You now have a shallow box four by eight by thirty-four inches about. The dimensions are not obligatory. Suit yourself. Coat this box, which has been carefully planed before nailing, with melted paraffine. Honey candied in this is easily removed when hard and cold. The slab can be taken out by removing screws and pulling off sides and ends of box.

Such a box will hold 30 to 40 pounds of honey, and if you are planning candy on a large scale you will have to make several such boxes.

The slabs of honey are cut with a thin sharp and long knife into parallelopipeds of various dimensions suitable for coating. They can be cut in nougatine form, caramel form or into small cubes. First cut off slices about half to five-eighths of an inch thick and then cut these slices into strips and then the strips into the final pieces. The slicing should be done in a room about 55 to 60 degrees, and the small

pieces at once tumbled about in powdered sugar and then set on waxed paper in close ranks. If now placed in a still colder and dry room they will become very dry and easy to handle.

If one has never done any dipping he would do well to get friendly with some local candy maker and get some hints. Dipping is an art in itself. I can give a few simple directions, but success will not come on your first trial. Buy a good grade of coating. The highest priced is not always the best. At first you will do well to use the coating as it comes. Later you may wish to do your own blending of sweet coating, bitter coating, and cocoa butter. Good coating can be bought for from 20 to 30 cents per pound, and for even less in large quantities.

Melt the coating in a double boiler or cereal cooker. Do not overheat, allow time. When ready for dipping the melted chocolate should not feel hot, but merely warm to the hand. It should be creamy and small streams allowed to fall should keep their form for a moment after they reach the mass. Do your dipping in a room not over 60 degrees if possible. Have either oil-cloth covered slabs or else waxed paper upon which to lay the dipped candies. Each piece is dropped in turn into the melted chocolate, given a roll and then removed to the paper or slab.

Different dippers use different methods. Some use only the fingers, others use forks, while others use special devices. I often use a hat pin and a kitchen fork, jabbing the pin into the honey, dipping same into chocolate and using the fork to dislodge the piece. There is great latitude here and everyone will choose the way easiest to him.

If the coating is too hot it will run and form a wide foot. It will also tend to be mottled. Before dipping the coating should be thoroly stirred and be creamy thruout.

The resulting confection is very rich and has the admirable feature that one cannot sit and eat a whole box at once. On the other hand it is too monotonous to suit many a candy eater. As we make to sell, we want the candy eaten up rapidly. We can give it variety as follows: Chop up nut meats and mix with the honey just before pouring it into the forms. Use in like manner chopped fruits of suitable character. Skilful persons can coat cherries and cranberries with candied honey or nut meats. Others will choose to lay halves of walnuts or pecans on the candies just after dipping. There is great opportunity here for ingenuity.

Last year for the first time I essayed dipping comb honey. It seemed most difficult at first thought, but actual trial proved it very simple.

Warm lightweight sections, or other comb honey in a room which is about 80 degrees. Make ready a shallow pan, a big cooky tin, or any big pan. Make a slat arrangement for this pan with slats alternating one and three inches apart. Lay each comb in turn on a block of wood and with a very thin and sharp knife cut slices of honey in such a manner that one row of cells will remain intact. Stand these slices on edge across the slats. Continue until you have the entire pan

covered with possibly 100 such slices. Allow to drain half an hour or so.

Dip just as before except now you will find two forks convenient, one for each hand. Lay a slice in the chocolate, roll it over and remove to the waxed paper. You will now have what I term a "honey bar". It is a chocolate bar with a comb honey filling and is most delicious to any lover of chocolate. I find a ready sale for them and especially in the school lunch. Anyone near a large school where a lunch counter is run can find a market for many gross of these bars. A small glassine envelope or bag is fine for putting each bar into, but adds to the cost. I find that I can make them to sell at four cents so that they can retail for five.

Cooking honey spoils its flavor very quickly. Fortunately there are some honeys that can be cooked slightly without spoiling the flavor. In fact, some varieties are improved with slight cooking. If then we can select the right variety we can make a delicious pulled candy by following the directions I will now offer.

To make two pounds of candy put about two cups of sugar to half a cup or so of water and add a small pinch of cream of tartar. Boil in a shallow pan without stirring.

With a clean spoon carefully skim once or twice. This is to remove any sugar crystals, and is unnecessary if all is carefully dissolved at the first. Cook until the syrup begins to turn yellow. If you have a thermometer you will find that the temperature is almost to 300 degrees. Do not burn. When you have the syrup cooked to this high temperature, about 290 or so, pour in one to two cups of honey. Try one cup in first batch and decide later whether you can use more. Use all you can and get results.

Now comes the difficult part. If the honey is very heavy and ripe it will add but little water, but if thin it will add much water. This added water must be got rid of. The mixture will at once cool down and will begin to boil again at perhaps 250 or 260. It must be carried if possible to about 280 in order to pull well. To do this without spoiling the flavor of the candy is very hard indeed. It can be done, for I have done it many times.

When the mixture is done pour into buttered tin and allow to cool slightly. Do not let it harden. If done enough one can pull it with the bare hands, beginning when it is so hot that it almost burns the fingers unbearably.

Pulling candy is an art and has to be learned the same as dipping. Most people handle the candy too much in pulling, squeezing and mauling it. Pull with the finger tips touching the candy as little as possible. Pull it out long and fold together so as to entrap a lot of air. When pulled properly a hunk of candy will treble in size because of the entrapped air. This makes the candy very white and light, delicious to chew.

Honey is very deliquescent, that is it absorbs water from the air. All candies made from honey must be coated. This pulled candy can

be cut into small pieces and given a chocolate coating or it can be wrapped in waxed paper.

All three of these candies I mention meet the need of the sweet-loving child and they have the most desirable characteristic. They are pure and wholesome.

Following were some of the questions asked Mr. Latham and answered by him at the conclusion of his address:

Q. How do you keep the paraffine in your pans from cracking?

A. Use a softer paraffine.

Q. Do you use burnt sugar in your chocolate?

A. No.

Q. Do you try thinning your chocolate with cocoa butter when too thick by age?

A. Better thin with other chocolate or use it to make a cheaper candy. It ceases to be good coating when it gets thick.

Q. What about the cooling off process?

A. It is very slow.

Q. How do you tell good chocolate coating?

A. Get a good brand such as "Gladiola" or "Dot" brand.

SOME HIGH POINTS IN HUBAM AND HONEY PRODUCTION.

(By Edw. A. Winkler, Joliet, Ill.)

I firmly believe that the $3,500 I invested in growing Hubam seed in 1921 was the best investment I ever made. My seed crop the past year can easily be called clear profit, for the honey I got from my Hubam the past season will more than cover my past expenses in raising my 1921-1922 crop of seed. Also bear in mind that I have a big honey crop to look forward to the coming season and for years to come. Truly a bright outlook, fellow beekeepers, and I wish that you all could have the good luck such as I have had and could look forward to a large honey crop that is practically assured every year.

What I have done to insure a yearly honey crop here in Will County, you too can do if there are any progressive farmers near you. Many beekeepers and wouldbe beekeepers have written to me already for locations, saleable apiaries, etc. You can make your own locations just as profitable as I have made mine, all you need is a little capital, nerve, and judicious work. Bear in mind that I did not induce Will County farmers to plant Hubam for my own pecuniary benefit or the benefits I would derive from it through bees, but realized that it was the coming clover for the farmer to plant and that the real issue and benefit that eventually would be gained from Hubam would be in soil building.

A great deal of experimenting will be done here this year with Hubam. One of them will be to plant Hubam in corn, using the soy bean attachment with a special disc, the plan being to get a stock of Hubam growing in every or every other hill of corn.

I do not believe that the stock of Hubam will sap any great amount of nourishment from the hill of corn, for I rather think it will stunt the Hubam, but it will bloom and seed enough to completely reseed the field so that in the following spring when the grain is disked in, the field will already be seeded to Hubam and a saving of 12 to 14 pounds of Hubam seed to the acre will be made. About one-half pound of Hubam seed to the acre should be enough and some system of planting should be used to have the seed drop so that the wheels of the planter will cover the seed. How much will be smothered from hilling the corn up, and which is the only objection to this method, will be determined this year.

We are cleaning and scarifying Hubam seed here now for the farmers with a large portable power cleaner I purchased this winter. The cleaner and scarifier are loaded up as per illustration and taken right to the farms, and as the machine has a capacity of 25 bushels

per hour, a very nominal charge is made per bushel; some seed analyzing 99 per cent after being run thru once.

This seed cleaning is not a money making business, for I endeavor to do it reasonably and for less than I value my time. It is another inducement for it enables the farmer to retail a clean scarified grade of seed to his neighbors at a profit rather than ship it all to a seed house in the rough state and thereby get it out of this county. For, as I've stated before, my desire is to get Hubam growing on every farm in Will County and if every farmer in this county planted Hubam as he should for his own benefit the coming year, there would not be near enough seed in this county to go around, and the past year Will County produced more Hubam seed than all the rest of the State of Illinois.

By the way, this trailer is equipped with a Brice automatic coupler, is attached or detached in a few seconds and is a one ton trailer. I have carried 2,600 pounds safely on it several times and it has been a real time and labor saver to me the past two years. It takes the bumps much easier than a Ford touring car and is better than a one ton truck. It is low down, no drag and we push a 9 ft. x 10 ft. x 7 ft. high honey house over on it and move it most as easy as we haul 20 winter cased hives of bees.

Although honey movements have been rather slow this winter, yet if we can produce larger crops we can sell at a price within reach of all, then I do not believe we need fear of an over production, for if Hubam yields yearly as it did in 1922, I can produce honey and sell it by the car for 6 cents a pound and make money doing it.

In these years it is capacity or quantity that counts and the one that can run his business at double capacity is the one that will come out on top.

Most all business nowadays is done on a large scale, larger business and small profits.

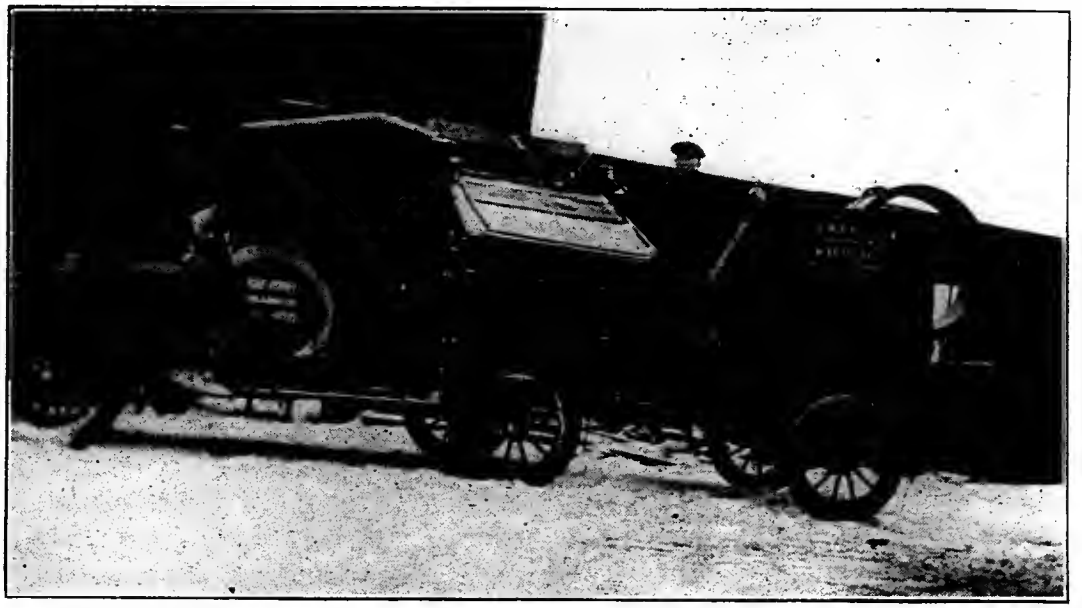
Class yourself in the doer grade, wake up you Mr. Beekeeper that have had your location and trade all to yourself so long that you think you own it, for sooner or later some young fellow with a lot of nerve will steal your trade from you, crowd in on your location with new methods of progressive beekeeping and soon you will be forced to find other means of occupation, for I never saw such interest manifested in beekeeping as there has been the past two years. So remember quantity, production with more extensive and progressive methods is the only thing that will save you.

There is lots of room for improvement in your locations and there is a lot you can gain by getting into this Hubam movement as I have. I have not had much experience with Hubam growing in a wild state and left alone, but a handful of seed scattered with hulls from my scarifier last spring around on my lawn which is of a heavy sod and after continually being mowed every week with a lawn mower, until late in the fall, grew up to a height of from 9 to 12 inches and set bloom after the lawn was laid by. Other seed grew outside my shop door in the back yard which has a top dressing of 5 inches of ashes,

and grew up to 18 inches high, and set seed. A small row planted on an abandoned hillside of hard clay, by a wouldbe enthusiast and then neglected and left to itself seeded in 1921 and last year, 1922, there was a considerable patch growing and appeared as if it would multiply and gradually cover the whole hill in time.

One farmer I sold 700 pounds to last spring planted it all in nurse crops and in November shipped a car load of over 26,000 pounds after keeping out some for local selling and next year's planting.

The time reduction realized in crop rotation with this peculiar and most useful legume, I believe, will overcome the ravages of the chinch bug pest and may have some bearing in reducing the destruction caused by the Hessian fly.



Edw. Winkler with his seed cleaner and scarifier going to the farmer's help.

Limestone when used as a soil improvement agent in sufficient quantities has been found to retain the fertility of the soil with the aid of leguminous plants for a period of 20 years. An application of sufficient limestone should be made to correct the acidity of the soil and then apply just enough at each rotation to maintain the soil in a neutral state.

Sweet clover will do well on many soils which are not fertile enough to grow red clover or alfalfa, and it is on these soils that it will prove most valuable. Like many other plants, it makes its best growth on fertile soils rich in calcium carbonate, although it will make sufficient growth on poor soils which are not acid to warrant planting it on them. Many hilly pastures may profitably be seeded to sweet clover. It will not only make a valuable addition to the forage of these pastures but will improve the soil so that grasses will grow more abundantly. Some of the best pastures in the middle west are composed of bluegrass, timothy, and sweet clover.

Sweet clover, like all legumes, has the power to extract nitrogen from the atmosphere, and on account of its extensive root system it is

able to obtain phosphorus and potassium from a larger area than most plants. The large roots not only add a quantity of humus and nitrogen to the soil, but they also open it up to a considerable depth, thus providing better aeration and improving its physical condition. Improved physical condition causes the bacterial flora to increase and thereby indirectly causes a larger quantity of unavailable phosphorus and potassium to be made available for plant use.

I had very little time to requeen any in 1921 and consequently my colonies were not headed with very young queens in 1922 and consequently were below normal last spring considering the favorable winter. What good full colonies with young queens will do was shown by quite a few of my colonies that produced 450 pounds each the past year.

It is a well known fact that it pays every successful beekeeper to become a member of all Beekeepers Associations in his county and State. But one of the best investments he can make is to join his County Farm Bureau and by so doing get in close touch with his neighbor farmers with whom he can talk legumes, land fertility, forage, etc., and directly become acquainted with some of the largest clover raisers of his county.

It does not require a great deal of time to interest farmers in your calling and with the growing tendency of the progressive class of farmers it soon becomes evident that they are more dependent on the beekeeper than they had thot for. This in a large measure depends on the beekeeper in explaining the necessity of bees for fertilization of their clover bloom.

Don't expect the farmer to know anything about the fertilization of clover blossoms, for the average farmer has read very little, as there is very little written on this subject that the farmer is apt to get hold of, so it is up to the beekeeper to enlighten him. By so doing you will soon find that you are no longer looked upon as a "keeper of bees", but as an apiculturist with a worthy occupation that the country as a whole is very dependent upon more or less, for the fertility of its orchards, gardens and farms.

You will be told that years ago there were very few large apiaries and large yields of fruit, etc., harvested. Today where farming is becoming more concentrated, more clovers being raised and more extensive farming being practiced and with the fast removal of the woodlands, the old home of the wild honey bees is passing. The occupation of the apiculturist is a worthy and very needy one. Much more so than our representatives, statesmen and government officials have become aware of, and never before has it been so clearly demonstrated that the advent of beekeeping has become of so great an importance to the agriculture of this country.

And as the two are so closely related and, figuratively speaking, they go hand in hand, each benefited by the other, it becomes clear to all of us that the creator was not only very generous but extremely farsighted, for Mother Nature was not forgotten.

One of the things that is outstanding in my success is the art of concentration and stick-to-it-ive-ness. All successful ventures are founded upon these. There are many paths and by-paths in beekeeping and to be a successful beekeeper one must follow them all, experiment extensively and promote those developments that insure a successful future. These and all other practices are included in concentration upon the business you undertake.

SWARMING.

(By Geo. S. Demuth.)

In the early days of beekeeping swarming was considered desirable, for it was only thru swarming that increase for slaughter could be obtained. Later on swarming was looked upon as a necessary evil, being considered a part of the annual program of colonies of bees.

Perhaps beekeepers would have been content to continue looking upon swarming as a necessary evil if they had not discovered that under some conditions colonies of bees will go thru the season without swarming. This sometimes occurs even during the best of seasons when the colonies which refrain from swarming usually give a record yield. Furthermore, beekeepers observed that during some seasons a majority of the colonies in an apiary would swarm while during other seasons only a few would swarm. While it might be expected that most swarming would occur during a prosperous season, this is not always the case, for sometimes a large proportion of the colonies would swarm during a poor season for honey and other times only a few colonies would swarm during a good season. It was common knowledge among beekeepers many years ago that while much swarming might be expected during a prosperous season, a good honey flow does not necessarily mean much swarming. In addition to this it was apparent thru the writings of beekeepers from different localities that swarming is easily controlled year after year in some locations, while in other locations it is exceedingly troublesome almost every year.

These differences in the behavior of colonies of bees in the same apiary during the same season, in the same location during different seasons; and in different locations caused beekeepers to search for that which brings on swarming in certain colonies and that which tides other colonies over without a thought of swarming.

In the search for the thing that throws the switch and leads colonies headlong into swarming, some have looked upon swarming as an inherited trait that might be bred out. At one time American beekeepers made a serious effort to breed out swarming by careful selection from stocks less inclined to swarm. Some even claimed to have produced a non-swarming strain of bees, but today it is generally agreed that swarming cannot be eliminated entirely by breeding tho it has no doubt been greatly reduced by the elimination of stock too much given to swarming without sufficient excuse.

Lack of room is generally recognized as contributing to the tendency to swarm. As a rule, colonies in large hives swarm less than colonies in small hives. At one time it was thought that swarming could be eliminated entirely by means of large hives. It was pointed

out that colonies of bees established in attics do not swarm because of the great abundance of room for the queen. In some localities a large brood chamber does practically eliminate swarming, but when the same large brood chambers are used in other localities swarming results. Large hives and an abundance of room in the form of empty combs will go a long way toward the elimination of swarming, but they do not prevent swarming entirely in all localities every season.

The beekeeper in the white clover region of the northeastern part of the United States and parts of Canada is led to believe that swarming is a result of a good honey flow from white clover and alsike clover, which comes in bloom about the time bees begin to swarm. But he also notices that when the bees were wintered well colonies sometimes swarmed before the opening of the clover bloom, swarms sometimes issuing even during the dearth of nectar just previous to the beginning

Apiary of F. Disart at Lincoln, Ill.

of the honey flow. In some localities, especially in the south, swarming occurs several weeks previous to the beginning of the main honey flow and ceases entirely when the honey flow begins. While the honey flow greatly influences swarming, it cannot be considered the cause.

At one time it was thought that the presence of a large number of drones in the hive brought on swarming. This is the theory of swarming which caused Aspinwall to construct wooden combs by drilling holes into the ends of blocks of wood to form the cells in order to eliminate entirely drone cells. He was not successful in eliminating swarming in this way.

Again it was thought that swarming is brought on by the presence of an old queen. Working on this theory some beekeepers in the north requeened their apiaries in the spring before swarming time with young queens from the south. While this reduced swarming to some extent, it did not eliminate the trouble, for many colonies having young queens swarmed a few weeks after the young queens were introduced. Graven-

horst laid down the rule that a colony having a laying queen reared this season will not swarm this season, provided the queen was reared in this colony. If she was reared elsewhere, the colony may swarm this season. But we know that if the old queen is removed at swarming time and all queen cells (if any) are destroyed, then all queen cells again destroyed ten days later, a young laying queen from another colony may be introduced a few days later with as much safetv from swarming as tho the young queen had been reared in this colony. Apparently the condition of the colony brought about by the period of queenlessness has more to do with the prevention of swarming than the age of the queen.

Gerstung, a German investigator, put forth the theory that swarming is brought on by an unbalanced condition of the colony as to age of bees, swarming being the result of a preponderance of young bees. This fits in well with the well-known facts that the tendency to swarm is strongest early in the season when young bees are emerging in greatest numbers. It also helped to explain why swarming is worse during those season when the building up is most rapid so that an abnormal number of young bees are present in the hive at the time of greatest emerging. It also explains why swarming is more troublesome in the north where brood reading is conducted more rapidly in the spring than in the south. It also helps to explain why colonies are willing to give up swarming when their brood is taken away as in artificial swarming as well as why the swarming impulse disappears about 20 days after removing the queen when the dequeening plan to prevent swarming is used. This theory is the basis for the so-called "shook swarming" in comb-honey production and the Demaree plan in extracted-honey production. The theory is also the basis for the construction of the Aspinwall non-swarming hive which provided extra room between the combs for the surplus young bees. However, a large proportion of young bees does not always bring on swarming under good management. This has led some to look further for the cause of swarming.

The tendency to swarm is greater in those localities where weather conditions and the character of the honey flow cause field bees to stay within their hives during a part of the day. Swarming is less troublesome when the field bees can work in the field from morning till night. Years ago it was noticed that swarming is less troublesome in the arid regions of the west where alfalfa and sweet clover furnish a dependable source of nectar and where weather conditions are usually favorable during the honey flow. In the east the field bees are often confined to their hive during the honey flow by rain or by erractic yielding of the flowers.

Out of all this confusion of ideas in regard to swarming there now appears one thing that is always present in normal swarming so far as the prime swarm is concerned. If this one thing is present the colony is liable to swarm whether the strain is one that has been bred for non-swarming or not, whether the hive is large or small, whether the colony is weak or strong, whether the queen is several years old or only a few weeks old. This one thing that is always present is a congestion of

bees within the brood nest, bringing to the colony a feeling of strength or a need of expansion. This then is the thing to avoid, for without congestion of the brood nest there is but little if any tendency to swarm.

If this congestion is brought about in a weak or medium-sized colony by the colony confining its work to the brood chamber leaving the supers and remote brood combs vacant and crowding the queen by surrounding the brood nest with honey, the congestion within this little brood nest is as real and as potent in bringing on swarming as tho the colony were twenty times as strong. The remedy in this case is stronger colonies or a strain of bees less inclined to crowd the queen in this manner.

If the congestion and discomfort are brought about by a lack of ventilation or shade the remedy is obvious.

If the congestion is brought about by a preponderance of young bees which are inclined to stay in the brood nest too long, at least a partial remedy is to invite these young bees into the supers by giving a set of attractive empty combs immediately above the brood combs, thus making the invitation as strong as possible.

If the congestion is brought about by field bees staying at home, as they often do even when nectar is plentiful because the hive is already crowded and uncomfortable, the remedy is to invite more bees into the super and give more ventilation if needed.

As is well known it is sometimes easier to control swarming in strong colonies than in weak or medium colonies. The congestion within the brood nest is a result of improper distribution of bees thruout the hive, for the hive can be expanded to accommodate even the largest colony. Bees must be induced to expand their work as the hive is expanded. If most of the bees can be induced to leave the brood nest, going either into the supers or to the field, all is well.

If the congestion in the brood nest is caused by field bees staying at home during the day waiting for the flowers to begin to yield, the problem becomes more difficult, but here again anything that adds to the comfort of the colony should help.

STORES AS CROP INSURANCE.

(By G. H. Cale.)

Feeding has at times been a much abused practice and a subject of considerable discussion in the bee magazines. In the spring it is common to have colonies run short of stores, and since usually there is a possibility of minor nectar flows occurring to make good the deficiency, feeding is often neglected. Nature is ever a fickle dame, however, and colonies should be watched to insure that sufficient food is constantly present to prevent starvation. As long as there is capped honey in the hive, additional food is, for a time, unnecessary.

However, since, the object of all well directed work in the apiary previous to the honeyflow is to have a strong gathering force when the flow begins, there comes a time in spring when feeding is done not only to prevent starvation but also to insure the continuance of brood rearing. When the queen breaks her winter's rest and starts to lay, the daily quota of eggs gradually increases until a high level is reached when the number of eggs in a day may average three or four thousand. Under favorable conditions there is no other period in the year when the amount of brood present at one time is as great as at this peak in the first part of the season. Strong colonies may then increase their population from a force of 15,000 to 20,000 bees to one of 80,000 or more, an increase of 12 to 13 pounds of bees.

Food Required.

Unfortunately, conditions are not always favorable to this increase and one of the frequent drawbacks is the lack of the stimulation which comes from the presence of an abundance of food for the development of the brood. Where there is a limited food supply the number of mouths must of necessity be restricted, and unless nectar is to be found in plenty outside the hive, the daily additions to the brood inside will be reduced some time before the reserve food is exhausted. Strong colonies with large amounts of brood often do not retrench quickly enough, and when stores are scant such colonies must be watched carefully, since they frequently die of starvation in a very short time.

This behavior places an emphasis on feeding which has not been given often enough. A few figures on the requirements of brood are available which are interesting and of much practical value. In looking over the results of the experiments in beekeeping conducted by R. L. Taylor at the Michigan Agricultural Experiment Station, Demuth obtained figures from which he was able to express the total food requirements of the honeybee from the hatching of the egg to the emergence

of the adult. It requires approximately 5 pounds of honey to a pound of bees; or one frame of honey to one frame of brood. The probable accuracy of these figures will be readily supported by those who have observed the swift disappearance of stores when brood-rearing is at its height. To increase in numbers from 3 or 4 pounds of bees in early spring to the 16 or 18 pounds which we like to have before the honey-flow, takes a minimum, therefore of 60 to 70 pounds of honey, not figuring the food consumed by bees which emerge or are removed by death.

G. H. CALE.
President of the Chicago-Northwestern Beekeepers' Association.

There is also another factor which enters the feeding question at this time. The mere production of bees is not so important as the need for *bees of the right age at the right time.*

Since the honeybee is not capable of materially renewing its energy, the life of the worker is not measured by time, but by the amount of

work done. For the maximum efficiency of the honey-gathering force, therefore, the workers must not have consumed much energy in field labors before the honeyflow begins. Bees may easily be too old for the production of the largest crop. On the other hand, it is equally true that a working force with a majority still too young to engage actively in field work will not do justice to the honeyflow until the bees age a bit. It then frequently happens that the best of the flow is over. There is evidently a definite period previous to the honeyflow, during which the raising of bees is the most favorable thing a colony can do.

For practical discussion, the factors which may be considered as determining this period, as above indicated, are the length of life of the worker and the age at which bees first go to the field. Since the usually accepted average for the life of the worker is six weeks, bees emerging

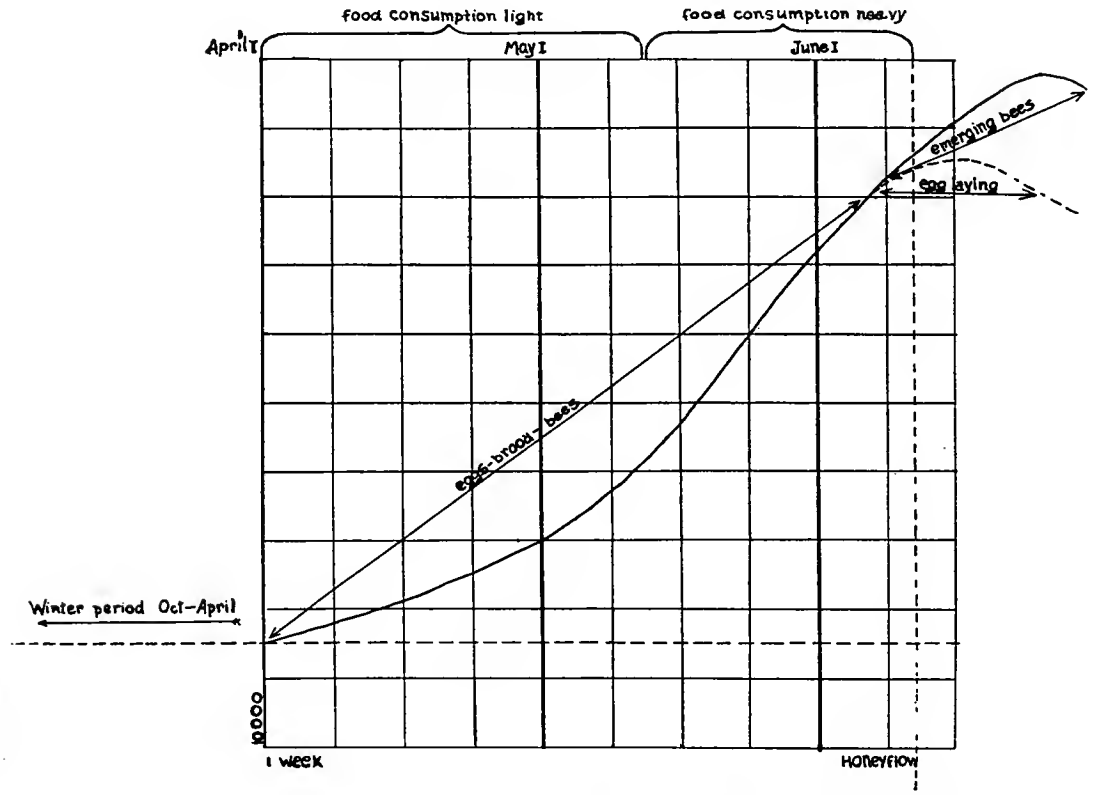


Chart showing relation of stores to progress of spring brood-rearing.

previous to the sixth week before the honeyflow are of no use during the flow. Hence, brood-rearing, from the beekeeper's standpoint, assumes first importance in the colony activity for a month and a half before the honeyflow. Yet of the workers produced then only those that are just becoming field bees when the flow starts will be of maximum value. When brood-rearing is at its best, it is not unusual to see 75,000 cells of brood at one time, and we would like to exert some magic which would insure all this brood present as eggs about 35 days before the flow. Should the harvest last over six weeks, of course, it is important to continue with a renewed force of workers until it ends.

There are regions and seasons when, under a natural stimulus, this peak of favorable population is long past before the flow begins

and the beekeeper's problem is then complicated by the need of delaying the peak in some way, or of continuing the heavy brood-rearing. No two seasons are alike in this and the beekeeper must be alert enough to be able to shift his program to meet the needs of the occasion.

It is generally unsafe to depend entirely on the nectar resources at this time of year to supply the rich abundance of stores so essential to the development of numerous honey gatherers. Each three days, for weeks at a time, a fertile queen may easily fill two frames with eggs which hatch into thousands of hungry larvae. The enormous growth which these tiny creatures make in the six days of their larval life is indicative of their food requirements, and there are periods when over 6 pounds of honey a day are needed to keep up the development. When sufficient nectar is obtained, to furnish this amount of food daily, it comes pretty near being a honeyflow for which the bees should have already been developed.

Providing the Food.

The result of this discussion is to bring us back again to the need of providing the colony with at least a part of its spring food requirements in some other way. The feeder is usually resorted to and frequently of necessity. There are years when the early consumption of stores is excessive, due to unusual climatic conditions; or the honeyflow the year before may have failed to supply enough for reserve stores; or other obstructions due to unavoidable circumstances may leave the feeder as the only way out. It can scarcely be disputed, however, that from all points of view, the ideal way to provide stores is to leave an abundance of sealed honey with each colony in the fall; enough to last the winter through and, under normal conditions, to provide for brood-rearing in the spring. There seems to be only two excusable situations for using the feeder, (a) to prevent actual starvation or an undesirable shortage due to unavoidable conditions; (b), to stimulate brood-rearing between honeyflows or in queen rearing.

In either case syrup, or candy made of granulated sugar or honey free from disease, are the only foods which can be universally recommended. In feeding to make good a deficiency, the syrup is usually made of one or two parts of sugar to one of water, but for stimulative purposes a much thinner syrup is more effective. A common formula is two parts of water to one of sugar, but it is frequently made even thinner than this. Unless feeding for winter stores, no attention need be paid to securing the inversion of the sugar to prevent granulation, since the bees readily take care of this part of the process. The heaviest feeding is best done during the six weeks' period when brood-rearing is of most value and it must be remembered that at this time large amounts of food are necessary.

Stimulative feeding is a matter which can be overdone, especially in the early season, when the weather is still cool. The practice of stimulation at this time is often inadvisable and, in the hands of the inexperienced, it is easy to overcome the good judgment of the bees and induce them to rear more brood than they can care for properly. Later

stimulation may be valueless, since usually when it would do the most good there is sufficient nectar available to serve the same purpose. It should be again emphasized here that, in the spring, neither stimulative feed nor nectar alone take the place of an abundant reserve of stores. Whenever there is a dearth of nectar, however, or it is necessary to keep up brood-rearing out of season, as in queen-rearing, stimulative feeding is an acceptable practice.

Candy feed is most useful in cool weather to prevent starvation from lack of stores. The ordinary Good candy, or queen cage candy, in amounts sufficient to give five or six pounds to each colony, is satisfactory. The receipt for this candy is well known and calls for honey or invert syrup mixed to a stiff dough with confectionary sugar which contains no starch. If honey is used in making the candy it must be free from disease. When mixing, it is a good scheme to heat the syrup or honey, since the resulting candy will then remain stiff at ordinary temperatures. Paper pie plates serve well as inexpensive containers. Two of these filled with candy and inverted over each cluster of bees will last a long time, unless brood-rearing becomes too great. It is also important to keep the cluster covered with some protecting material, to prevent the escape of heat and, where packing of any kind is used, this may be replaced about the plates. Loose packing may be kept from sifting down between the frames by covering the top of the hive with a burlap or cloth before replacing the packing. Receipts are also available for making fondants, which are useful for feeding in this manner and which do not require the use of honey.

Preparing the Syrup.

When using syrup it is most practical to make, at one time, amounts sufficient to care for all the colonies that may need help. The sugar and water may be mixed and heated in a large container until the sugar is entirely melted. To carry the feed to outapiaries, five-gallon cans are convenient. We use five-gallon oil cans for this purpose, since it is easy to pour the feed from them, and they are stout enough to stand considerable handling. Of all the feeders used, we find the inverted or at mospheric feeder to be by far the most useful. Two of these, holding five pounds each, are inverted at the edge of the hive with the oil cloths, which we use, turned back just enough to let the bees get to the feed. In settled warm weather this is not of importance. Shallow pans of feed placed on the frames and covered with grass to serve as floats will do very well, but they are not satisfactory unless the weather is warm, since the bees may not take the feed readily. Outside feeders are not satisfactory, since they not only create considerable disturbance but usually colonies already well supplied with stores, being the stronger, get most of the feed, and the object of the work is thus partly defeated.

It is better to be beforehand than behindhand when colonies are in danger of becoming short of stores, and in a country where the roads to outapiaries quickly become impassable to machines after rains or thaws, it is important to watch the chances for visits to the yards. Each yard should be supplied with sufficient cans of feed and with feeders enough to care for later emergencies.

FOOD LAWS ON HONEY IN ILLINOIS.

Reports were made at the Springfield Convention that comb-honey labeled as "honey" had been judged misbranded by the State department and that the beekeepers so branding it had been ordered to withdraw their honey from the market or properly brand it.

Your Secretary got in touch with the department and finds that it is necessary to brand honey as "extracted honey," "comb honey" or "strained honey" to comply with the law.

Excerpts from the law are given below.

On any subject not made clear we suggest that each beekeeper take the matter up with the Superintendent of the Division of Foods and Dairies for Illinois. His name and address is Alfred H. Jones, 1410 Kimball Building, Chicago.

The following regulations were taken from the Illinois Food laws:

Definition of Honey.

1. Honey is the nectar and saccharine exudations of plants gathered, modified, and stored in the comb by honey bees (*Aphis mellifica* and *A. dorsata*; is laevorotatory, contains not more than twenty-five per cent (25%) of water, not more than twenty-five hundreths per cent (0.25%) of ash, and not more than eight per cent (8%) of sucrose.

2. Comb Honey is honey contained in the cells of comb.

3. Extracted Hfney is honey which has been separated from the uncrushed comb by centrifugal force or gravity.

4. Strained Honey is honey removed from the crushed comb by straining or other means.

Rules on Labeling.

Rule 1. Labels. (a) The term "label" applies to any printed, pictorial, or any other matter upon or attached to any package of food product, or any container thereof subject to the provisions of the Illinois Dairy and Food Laws.

(b) The principal label shall consist of (1) all the information specifically required by the Dairy and Food Laws. (2) All the information necessary to be announced to make the product legal in conformity with definitions, standards, rules and regulations.

This information shall be made in a conspicuous, plain manner without the intervention of descriptive or explanatory reading matter, which in any manner tends to make the necessary statements confusing or inconspicuous.

In preparing a legal label the following statements among others should be incorporated:

True or distinctive name of article.

Deviation from standard.

Presence of artificial color, and preservative.

Net weight, volume, or numerical count.

Name and address of dealer, manufacturer, or jobber.

The type used shall not be less than 8 point Brevier caps, unless the size of package makes necessary smaller type.

RULE 2. LABELING OF CARTONS. Cartons or other outside wrapers shall be labeled according to the same principle as the bottle, can, or other receptacle, contained therein.

RULE 3. STATEMENT OF NET WEIGHT, MEASURE, OR NUMERICAL COUNT. The net weight, measure, or numerical count of a package shall be correctly and plainly stated on the principal label.

In the statement of net weight, measure, and numerical count, manufacturers may be guided by the rules and regulations issued for the enforcement of the net weight sections of the National Food and Drug Act, except for such other rules and regulations as are promulgated by the Superintendent of Foods and Dairies. *Provided, however,* That a tolerance will not be granted or recognized except on such packages as, when full, come within the federal tolerance provision.

HOW TO SELL HONEY.

(By E. G. LeStourgeon, Manager, Texas Honey Producers Association, San Antonio.)

The beekeepers of Texas formed their association chiefly with the idea of marketing their product in the safest, surest and most economical way. Prior to 1916 the producer of honey in Texas sold his product to a now almost extinct species of "pirate" who bought up the crop at the lowest possible price and sold it without regard to any established channels of trade or any idea of business ethics. Time and again the producer sold his product at 5 to 7 cents per pound f. o. b. his station to these "honey buyers" while honey was being retailed in nearby markets at 25 to 40 cents.

In July, 1916, beekeepers agreed to pool their interests and sell their honey through a central agency under a uniform brand. Letters were written the wholesale grocers in Texas and nearby states offering this honey under a strict money back guarantee at a uniform freight prepaid price to the retail grocer everywhere in the trade territory, less a reasonable trade discount to the wholesaler. During that year less than $20,000 of honey was sold under the Lone Star brand, but within three years sales had grown to over $250,000.00.

Each year since the association was organized the members have received from two to five cents per pound more for their honey, sold through the association, than the "honey buyers" have paid to their neighbors. At the same time, owing to an established published price to the retailer everywhere, (the same in Oklahoma, Arkansas or in Texas), the price to the consumer has been lower on the average than formerly.

The marketing plan is simplicity itself. On the first Tuesday of April of every year nine members of the association, elected for the purpose at the annual meeting, having gathered reports on crop, price, flora, and general conditions, meet in San Antonio to compare them. Taking conditions and crop prospects into consideration they name a price that the producer should receive for his early spring honey. To this price is added the average freight paid per pound the year before on shipments to the retail trade, a charge of 1 cent per pound to cover the cost of labels and the rigid money back guarantee, and 12½ per cent (of the selling price) discount for the wholesale grocer. The total is the uniform price to the retailer everywhere. This price is published and the honey wholesalers begin to book orders.

When honey is ready the member notifies the association office and states the approximate number of pounds of comb or extracted. Con-

tainers, labels, and shipping instructions are sent to the member and he ships direct to the retail grocer to fill the orders booked by the wholesalers' salesmen. We do not solicit and do not want carload business. By the old plan honey was collected by the "buyer" at a central place (first freight charge), it was sent in car lot to the wholesale or jobbing point (second freight charge), and then shipped (third freight charge), to the retailer. Our honey goes direct from apiary to retail store. This is where our greatest saving comes in.

The association insists upon uniform pack and standardizes the container. No mark on can, case, or label, is permitted to designate the apiary from which the honey moves. A serial number on a uniform bill of lading, furnished to the member by the association, is the sole means of identification. The member is held to account for every claim against his honey, and if not up to association standard in every way the honey is ordered returned direct to him from the consuming point. (Thus some more freight and handling charges are saved). This returning to the unfair or careless grader of his product, with accumulated freight charges, is penalty enough and in all this time no serious controversy has ever arisen nor has a member ever refused to accept responsibility when pack, flavor or grade is questioned. In fact, we make our guarantee a very broad one. A person may return a can of "Lone Star Honey" to his grocer and get his money back for no reason at all. As we once said in our advertising, "'Lone Star Honey' is a money-back product. You may return it if your family does not like the color of the label." This sort of guarantee pays. It is necessary to fix confidence in the mind of the retailer and consumer. You would be surprised, as we were, how few unjust claims have ever been made. The guarantee has paid from every point of view. It has forced the beekeeper, far away from the office and no possibility of having anyone check up his grading, to pack honest weight, and honest grade; it has made the jobber feel that he can unreservedly have his salesmen push Lone Star Honey to his trade; it has permitted the retailer to have a steady supply of the very best honey, and confidence enough in it to recommend it to his best customers.

"Lone Star Honey" is never sold direct to the consumer nor even to the retail trade. "The laborer is worthy of his hire," and our great group of loyal wholesale grocer friends, scattered over a half dozen states, are worthy of being protected in the sale of our product. If an order comes to us direct from a retailer we write him a courteous letter asking what jobber he desires the honey billed through. The wholesale people are human as you and I, and they appreciate loyalty and cooperation on our part. (Perhaps they appreciate it the more because it has seemed to be a trait foreign to beekeepers in the past).

No product will sell itself. Advertising is only another name for salesmanship. To make "Lone Star Honey" a staple article of groceries on the retailer's shelf for an area 1,000 miles long by 600 miles wide we have had to advertise. The first was an attractive show card packed in each case, which a grocer can display in his window or store. This card carries the label full size in color. Second, recipe

books distributed by first class mail with a courteous letter direct to doctors, nurses, associations, hospitals, domestic science teachers, county agents, girls' canning clubs, housewives' leagues, boarding houses, institutions, hotels, etc., as well as by distribution through the retailer himself.

It semed slow at first, but it grew like a snow-ball. The railroad people notice us now and co-operate with us in reducing the danger of loss in transit and the filing of endless claims; the newspapers of the state have been prodigal of space and praise, many full page Sunday stories having appeared concerning our activities and achievements. The result has been that Texas is no longer an exporter of honey, but we must actually import many cars every year to take care of our demand and keep us a constant supply.

Unlike most associations of producers we have no contracts with our members. Each member is free to sell his honey wherever and to whomever he can. He is urged and encouraged to do so, the only stipulation being that he is on his honor not to sell to consumer, retailer, or jobber at a less price than the published price list of the association. We urge every member to develop as far as he can his local market and we aid him in doing so. (The association label is only used on honey shipped through the association itself). Many members enjoy a large trade under their own labels and draw their chief benefit of membership from the fact that their price is protected by the association price. It is honey consumption we want. Every pound that goes onto the table or into the kitchen is another step toward our goal of making Texas, which raises more honey than any other state, also consume more.

("Beecause" Magazine.)

THE AMERICAN HONEY PRODUCERS' LEAGUE.

(S. B. Fracker, Secretary, Madison, Wis.)

A letter received from a western state a few days ago, speaking of the American Honey Producers' League, said, "I believe there should be more definite information sent out to us so that we may know more about our relations with the League as members. Professor Wilson wrote and asked me to write an article stating what the American Honey Producers' League had done. If he will write the article and swear to it before a notary, I will sign it."

One of the biggest difficulties faced by the new officers of the League, who were only elected a few months ago, has been the fact that the members of this national organization knew very little about what was being done. A recent manager of a well-known advertising exchange in the United States said, "The beekeepers are so busy talking to each other that they have no time to talk to the public." Meaning that that was the principal reason for the continued weakness of the honey market. The American Honey Producers' League has perhaps gone to the opposite extreme and has talked to the public exclusively, neglecting its members to such an extent that by last summer support had become greatly reduced.

This was in no way due to failure on the part of the League to make progress along the lines for which it was established. In fact, as I have gone over the accomplishments of the League since its establishments I have been surprised at the amount which has been done in such a short time. On January 6, 1920, a little group of twenty-four met at Kansas City, adopted a constitution and agreed to try to make the new organization one of national importance. The executive committee elected at that time met again in December but the first general meeting of the organization was not held until less than two years ago on February 15, 1921, at Indianapolis. During 1921 the League developed from that little group of twenty-four to an organization of almost 2,500 members. During that year it handled over eight thousand dollars in cash, about half of that being in the general fund and the remainder in an advertising fund, secured largely from dealers in honey and bee supplies.

This rapid development was apparently somewhat too fast, for some of the affiliated organizations have been unable to continue membership on account of the high cost. Certain adjustments are being made this year which it is hoped will reduce the former difficulties and put the League on a permanent foundation rather than one which depends on the temporary enthusiasm of a "boom."

In organization the League differs from former national associations in being built up exclusively of other societies and having no individual membership of its own. A source of extensive correspondence from the secretary's office this fall has consisted of explaining to beekeepers in Pennsylvania, Florida, Georgia, Missouri, West Virginia, California and other states the necessity of their joining affiliated organizations before they could become members of the League, except at the commercial rate of $10 per year. It is believed that the experience of the National Beekeepers' Association, with a rapidly changing membership shows that the United States is too large a tract of country to make practicable an organization of individual beekeepers, scattered from the Atlantic to the Pacific.

There are now seventeen organizations affiliated with the League and the monthly mailing list of the League bulletin includes about eighteen hundred names. It is, in truth, a national organization for it is represented on the Pacific Coast by state associations of Oregon and Washington, in the Rocky Mountains by Montana and Colorado, in the Mississippi Valley by nearly all the strong state beekeepers' associations and in the east by the Empire State Beekeepers' Federation incorporated, which is a group of the various local beekeepers' associations of the state of New York. The objects of the League as stated in the constitution are remarkably inclusive but the work itself has been confined largely to certain specific lines to which a national federation is especially adapted. According to its founders, the purpose of the League is "to foster and promote better methods and systems of marketing; broader education in apiculture and research along the lines of interest to beekeepers; to provide legal aid to beekeepers and affiliated organizations; and to assist in the passage of reasonable and proper legislation; to assist in the standardization of bee equipment, containers and grading of honey; and to provide boards and committees of arbitration to settle or decide disputes involving affiliated organizations and members or subscribers."

As shown by its activities up to the present the primary value of the League has come from its work in increasing the demand for and sale of honey, the arbitration of business disputes and influence on legislation.

Last fall the League expended over five thousand dollars in advertising, most of that being used for space in the "Good Housekeeping Magazine." As a result of the direct requests which came from readers of the magazine who read the advertisement over eighteen thousand copies of honey recipe booklets were mailed out to individual consumers, mostly in the United States but some of them in other countries. Requests came in from practically every country in the world, including all those of Europe, several in Africa and Asia, as well as South America, Australia and the Hawaiian Islands. Several thousand additional booklets have been sold to beekeepers for distribution in their own localities, some of which had printed on them the name of the beekeeper distributing the booklet, others bearing the name of the League.

Another very important work for which the League is alone responsible was its influence with Congress which resulted in the increase in

the tariff on honey from less than one cent a pound to three cents a pound. As the beekeepers of the West Indies can afford to ship honey to the United States when they receive only two cents a pound at the point of shipment, this increase in the tariff is just large enough to divert practically all of the dark honey of the West Indies to Europe, making a place for the American product with our own manufacturers. When we realize how small an amount has to be imported at low a price to result in depressing the market in this country, we realize what an important factor this may be in the future honey market.

One of the least advertised activities of the secretary's office has been that of arbitrating possible disputes. The nature of this work is such that it has not been proper to publish the details. One hundred and fifty cases were submitted to the secretary last year in which the buyer and seller of bee supplies or bee products were unable to agree on the price to be paid or the time it was to be paid, or adjustments for loss in transit, and similar matters. Practically all of these have resulted satisfactorily to both parties and an immense amount of time, energy and disagreeable and expensive litigation has been saved. A case in which the League is assisting state officers in making an adjustment at the present time consists of that of a beekeeper who made a shipment of $430 worth of honey to another state and then received a check in payment which was returned marked "no funds." Arrangements in this case have been completed whereby the beekeeper will secure payment in full.

As cities become more congested there are increasing numbers of people who object to the idea of bees within the city limits. Half a dozen places of considerable size have had ordinances introduced prohibiting keeping of bees in town within the last two years. The legislative committee has in every case, we believe without exception, presented such strong evidence against the constitutionality of ordinances of this type that the attempt has been abandoned.

State organizations in previous years have held conventions at such irregular times that it was impossible for prominent members of the trade and of the United States Department of Agriculture to attend more than a few of them, due to repeated conflicts and the necessity for long trips to address one meeting. Under the present arrangement the schedule committee of the League is securing the cooperation of more and more state and district associations so that the beekeepers of the United States are getting in touch with the leaders of thought and action in honey production to a greater extent than they have ever done before.

One of the troubles which beekeepers in all parts of the United States have in common is that of depredations and molestation of outyards while the owner is away. Sometimes entire colonies of bees are stolen but more often the supers of honey are removed after the honey flow is over. It has been difficult to put a stop to this but the League is distributing warning posters at twenty-five cents apiece which are being placed in apiaries in many parts of the country. The funds being

accumulated in this way are being laid up to provide a reward for the arrest and conviction of the people who molest bee yards.

The most recent undertaking of the League is the publication of the monthly bulletin, in which the activities of the organization are explained to the affiliated members throughout the United States. This is mailed without additional charge to all supporters of the League, whether they are patrons giving $100 a year and more or individual members of affiliated organizations at the $1 rate.

The individual beekeeper then can see the results of his $1 investment in five or six important particulars.

First.—The free subscription to the monthly League bulletin.

Second.—The right to use warning posters offering a reward for the arrest of people molesting the apiary.

Third.—The opportunity to buy honey recipe booklets from the League at a discount.

Fourth.—In the future, as soon as the honey label is fixed, as it probably will be at the St. Louis meeting of the League, the members will have the right to use this label and will also have the right to use honey advertisements prepared by advertising experts, the beekeeper placing these advertisements in his local paper in connection with his own name.

We may therefore summarize the work of the organization as follows: It has distributed about twenty thousand honey recipe booklets in various parts of the United States, has advertised honey in national publications, has assisted state organizations in arranging their schedule so that speakers of national prominence could visit them in rotation, has been responsible for an increase in the tariff on honey from less than one cent a pound to more than three cents, has arbitrated over one hundred and fifty business disputes, has been instrumental in preventing the enactment of objectionable ordinances in half a dozen cities and is now distributing warning posters to assist beekeepers in preventing losses from theft, is cooperating with the federal department of agriculture in fixing standards and grades for honey, is keeping the beekeepers in touch with each other and with national apicultural interests through the publication of a monthly bulletin and is organizing a new advertising campaign which is to be placed on a permanent basis.

MARKETING HONEY.

(By E. R. Root.)

It is one thing to produce a crop, and another thing to sell it. Any one can produce a small crop by old-fashioned methods, but not everyone can produce a maximum crop under conditions that may not always be favorable. Similarly, any one can sell his crop at a price provided he is willing to sell below the market. But not every one can get a fair or good price for the honey he produces.

Practically all the teachings of the bee journals and of the various experiment stations have been devoted to the production end of our industry. Very little has been said, comparatively, about the other end—that of selling at good prices. It is because of this that my organization has felt that I should give the beekeepers in the country the benefit of our experience in selling. We may not be the largest buyers of honey in the United States, but I think I am safe in saying that we have been the largest individual distributors to jobbers and wholesalers and retailers of honey, and for that reason I believe we are in position to offer some helpful advice.

Were it not for the partial tie-up in transportation and other industrial strikes just now, honey would be selling at a good rate today, and at fair prices. But our present transportation difficulties have put the average buyer of honey, if he has to secure it from a distance, where he can not get it. The result is that the large honey-bottling establishments have been practically shut down. That these industrial strifes affect other lines of industry is shown by the fact that carloads and carloads of fruit are hanging on the trees and lying on the ground rotting in California. Other food products are being held back in the same way; and it is no wonder that there is a temporary slowing down in the sale of honey. Fortunately for the beekeeping industry a large part of the 1922 product will be sold locally along the roadsides and at groceries in reach of the beekeepers automobile trucks. It is only the man who produces honey by the carload, or at least in large quantities, who is suffering from these temporary tie-ups. But, as every sensible man knows, this temporary tie-up can not last indefinitely.

Among the things that may be mentioned to encourage the beekeeper at the present time are the following:

A higher tariff, both on sugar and honey. The effect of the proposed tariff of 23/10 cents on sugar, will, if enacted into law, help the beekeeper who produces large quantities of dark and amber honey. When these medium grades of honey can be bought for less than sugar syrup after it has been inverted, the baker will use large quantities of

honey. Within the last year or two it has been cheaper for him to use invert sugar than honey; but at the same or less price he will use our product. A higher tax on sugar will also help prices on table and extracted honey, for the reason that the housewife who, buying sugar because it was so cheap, will now consider honey that goes further and has a flavor all its own.

Of course the proposed higher tariff on honey makes it easier for the American honey-producer to compete with the West India product. In fact, it may give him the possession of the field so he will be sure to maintain the same prices that his honey brings at the groceries. This likewise can not be emphasized too strongly.

In fact, it may give him the possession of the field so he will have only domestic competition.

Another factor that is very encouraging is that all of the 1919, 1920 and 1921 honey left over in the West was practically used up by the beginning of this year. A year ago there was considerable western honey that was competing against the eastern crop. At the present time the western product is having the handicap of transportation difficulties. But that same handicap applies to eastern producers who have large quantities of honey that they cannot dispose of locally.

A third condition that is helping out the price situation to a remarkable extent in this country is the roadside and local selling of honey. Three or four years ago the average honey-producer used to believe that, when he did not sell to his immediate neighbors, he would have to dispose of it thru the city commission house, broker, and jobber, the latter paying such prices as they might see fit to give. But now that same producer has learned that he can dispose of a large part of his crop, if not all of it, within a radius that he can reach with his automobile truck. The roadside selling of honey has come to be so general that thousands of beekeepers once selling at jobbing or carload rates are now selling at retail. While that means an added cost, they are getting approximately 100 per cent more for their honey. But this is not all. Roadside and local selling have to a considerable extent prevented a glut in the big markets, and in some cases, at least, the buyer has had to do a little bidding to get his honey. But it should be made very plain that that condition, owing to the present tie-up in transportation, does not exist today, for the reason Mr. Jobber and Mr. Wholesaler can not get the honey from a distance, even if they are disposed to buy it.

The small beekeeper of 10 to 25 colonies usually has no difficulty whatever in selling his entire crop, and certainly not if he has only four or five colonies. But if he owns and operates from 100 to 200 he will be compelled to seek the assistance of the local grocers in his vicinity. And even then he may have the handicap of smaller producers, who, not knowing the prices, will sell to the grocery trade at very low figures. Where there are beekeepers of this sort it would be advisable to buy up their crop at wholesale rates and then sell to the grocer at a fair price that can be maintained year in and year out and

still leave a fair profit to the man who has considerable invested in the business.

It can not be emphasized too strongly that the beekeeper should subscribe for one or more bee journals. In these he will be able to get information in regard to the market, the prices at which honey is selling in a large way, in carlots or lots of 10,000 to 20,000 pounds. He should then sell his honey in a retail way at from 100 to 150 per cent above the carload rate. A single pound bottle of honey can not be sold at less than 150 per cent above the carload rate and leave any margin to the beekeeper who puts up his honey in that form. Honey in pails of five or ten pounds should be sold for from 75 to 100 per cent above the carload price. As a general thing, honey in five-pound pails should be sold for not less than $1.25, pails included, in ten-pound pails not less than $2.00. Of course, when the beekeeper sells to the grocer he must allow the latter 20 to 25 per cent off for the selling or else he will not touch it. Then when he sells at retail from his residence or along the roadside he must be sure to maintain the same prices that his honey brings at the groceries. This likewise can not be emphasized too strongly.

Some beekeepers located out in the country and along the automobile highways are able to sell from 5,000 to 25,000 pounds of honey in a single season. Honey sold in this way should be put up in tin or glass, using attractive labels. It should then be placed on sale in an attractive booth near a main automobile highway where it can be seen. Honey in glass should be of the best quality, and have been heated to a temperature not exceeding 150 degrees Fahrenheit, and sealed up immediately while hot to prevent granulation. Honey in tin may be put up without heating. But there should be an explanation the label showing that this honey may granulate, and, if so, it may be brought back to a liquid condition by immersing the pail in water not hotter than 150 degrees Fahrenheit for a short time.

To boost the sale of roadside selling, it is very helpful to have a series of neatly printed signs distributed up and down the road for a mile or two on each side of the honey-booth, carrying the word "Honey." Along with the honey-booth there should be a few hives of bees to help attract attention, and to assure the prospective buyers they are getting their honey direct from the producer himself.

The grocers in the surrounding towns should likewise be supplied with both comb and extracted honey, and to help boost the sales it is sometimes advisable to give a live-bee demonstration in the grocer's window some Saturday afternoon. It is always helpful to use a one-frame glass or observatory hive where possible customers on the street can see the live bees, along with a neat display of honey. The local producer should do everything he can to help the grocer sell his product, and to that end it would be advisable to insert a little story in the local papers about the honey and his beeyard located on such and such a road. This should be followed up with some advertising telling what stores are handling the honey.

Considerable can be done in selling honey by parcel post. The containers should be well sealed if the honey is liquid, and carefully packed to prevent breakage. Honey in tin pails that has granulated solid can easily be sold in this way. Honey can not be disposed of thru the mails unless some advertising has been put out in the papers.

A great deal can be done by having a honey-booth at local fairs, and near by, at certain hours of the day, live-bee demonstrations inside of a wire cage. Appropriate advertising cards should be distributed telling at what groceries the honey can be had after the fair closes.

GRADING HONEY.

Inasmuch as Illinois has not adopted a standard set of rules for grading honey, we recommend to our members, using either the Colorado grading rules or the Wisconsin grading rules.

Too much Illinois honey is going on the market ungraded, leaving a bad impression not only on the consuming public, but also on the retailer and the beekeeper who desires extra amounts of honey to fill in and supply his trade.

We give the Wisconsin grading standards as follows:

Standard Grades for Wisconsin Comb Honey.

Wisconsin Fancy.

Honey of this grade shall consist of (a) good quality comb honey in the different (b) colors known by the terms: Water White, White, Light Amber, Amber and Dark: in which the sections are (c) well filled and (d) well cleaned and the combs (e) firmly attached, (f) not projecting beyond the wood, (g) uniformly colored throughout, (h) evenly capped and entirely sealed except the cells in the outside row next to the wood which may be unsealed. No section of honey in this grade shall weigh less than thirteen and one-half (13½) ounces gross or twelve and one-half (12½) ounces net.

Honey of this grade shall be in the new best grade sections, weighing not more than one ounce and be packed in new cases. Each section and case shall be stamped or labeled "Wisconsin Fancy" and the stamp or label shall state the color and packer's number.

The front sections in each case shall be a true representation of the contents of the case.

Wisconsin No. 1.

Honey of this grade shall consist of (a) good quality comb honey in the different (b) colors known by the terms: Water White, White, Light Amber, Amber and Dark in which the sections are (c) well filled, (d) well cleaned and the combs (e) firmly attached, (f) not projecting beyond the wood and entirely sealed except that not more than six cells on each side, in addition to those of the outer row next to the wood, may be unsealed. Slight travel stain and slight irregularities in the surface are allowed in this grade and not to exceed ten cells on each side may contain honey of a different color. No section of honey in this grade shall weigh less than twelve (12) ounces gross or eleven (11) ounces net.

Honey of this grade shall be in new best grade sections weighing not more than one ounce and be packed in clean cases. Each section and case shall be stamped or labeled "Wisconsin No. 1" and the stamp or label shall state the color and packer's number.

Wisconsin No. 2.

Honey of this grade shall consist of (a) good quality comb honey in the different (b) colors known by the terms: Water White, White, Light Amber, Amber and Dark, in which the combs are (f) not projected beyond the wood, are attached to the sides not less than two-thirds of the way around, and are entirely sealed except that not more than a total of sixty cells in addition to those of the outside row next to the wood may be unsealed. Where twenty per cent (20%) or more of the cells contain honey of a darker color than the remainder, the sections shall be marked with the darker color. Honey in badly stained and propolized sections is not permitted in this grade. No section of honey in this grade shall weigh less than eleven (11) ounces gross or ten (10) ounces net.

Honey of this grade shall be in sections weighing not more than one ounce and be packed in clean cases. Each section and case shall be stamped or labeled "Wisconsin No. 2" and the stamp or label shall state the color and packer's number.

The front section in each case shall be a true representation of the contents of the case.

Marking of Ungraded Comb Honey.

Each section and case of comb honey, which is not intended to be marketed as "Wisconsin Fancy," "Wisconsin No. 1," or "Wisconsin No. 2" shall be stamped, labeled or marked "Ungraded."

Extracted Honey.

Wisconsin No. 1.

Honey of this grade shall consist of (a) good quality extracted honey in the different (b) colors known by the terms: Water White, White, Amber, Light Amber, and Dark. The honey shall be well ripened, (i) well strained, and shall weigh not less than twelve (12) pounds per gallon at sixty (60) degrees Fahrenheit.

Honey of this grade shall be in new containers. Each container shall be stamped or labeled "Wisconsin No. 1 Extracted Honey" and the stamp or label shall state color, net weight and packer's number.

Marking of Ungraded Extracted Honey.

Each container of extracted honey, which is not intended to be marketed as "Wisconsin No. 1 Extracted Honey," shall be stamped, labeled or marked "Ungraded."

Meaning of Terms.

The following terms, wherever used in these standards or regulations, shall have the meaning as indicated:

(a) "Good quality" comb honey means honey which is commercially salable, not containing pollen or honeydew, not extensively granulated, poorly ripened, sour or weeping, and not in leaking, injured or patched up sections.

"Good quality" extracted honey means honey which is not sour and has not been contaminated by honeydew, excessive use of smoke, dirt or foreign materials of any kind.

(b) "Color"—The color standards of the Root Honey Grader shall be deemed official for determining color of comb or extracted honey. The five official colors are: Water White, White, Light Amber, Amber and dark.

(c) "Well filled" means that eighty per cent (80%) of the area within the section shall be occupied by sealed cells.

(d) "Well cleaned" means free from propolis or other stain.

(e) "Firmly attached" means that the comb shall be attached to wood sections at least eighty-five per cent (85%) the way around.

(f) "Not projecting" means that no part of the comb shall project beyond the outer edge of the section.

(g) "Uniformly colored" means that all the cells contained in any section shall be of the same color.

(h) "Evenly capped" means that combs shall be free from pronounced irregularities in the surface.

(i) "Well strained" means honey which after being strained through two thicknesses of cheese cloth does not contain particles of wax or other foreign materials.

DISCUSSION OF THE GRADES.

There are three distinct grades of comb honey. All honey that is not intended to be marketed as one of the three comb honey grades or the one extracted honey grade must be marketed as "ungraded." Every pound of honey produced can be marketed, for any stock that is not good enough to class in one of the regular grades can be sold as "Ungraded." It must not be believd, however, that ungraded honey is always poor honey for some producers do not care to grade their honey and so sell it all as "Ungraded." Thus a buyer of "Ungraded" honey is taking chances as he is liable to get all good honey, all poor honey or a mixture of good and poor honey.

Comb Honey.—The grading of comb honey into three different grades is done from the standpoint of a number of quality standards, some of which are: Filling of the sections, cleanliness of the sections, attachment of combs to sections, uniform coloring of the comb, evenness of capping, the amount of cells sealed, and finally the weight of the sections. If the honey does not meet the specifications of one grade because of some one defect or a combination of defects, it can be tested by the standards provided in the next lower grade. For example—a

section of honey may meet all the requirements of the "Wisconsin Fancy" grade except five cells on each side of the section (in addition to those of the outer row next to the wood) are unsealed. Inasmuch as "Wisconsin No. 1" permits six unsealed cells on each side this honey would then grade as "Wisconsin No. 1." Honey showing defects not permitted in "Wisconsin No. 1" may be sold as "Wisconsin No. 2" provided such defects are not of such nature or extent as are barred from that grade. Honey not meeting requirements of "Wisconsin No. 2" can only be marked and sold as "Ungraded."

Requirements for sections and cases are somewhat different in the various grades. In the "Wisconsin Fancy" new best grade sections that do not weigh more than one ounce are required and only new cases can be used. If honey, no matter how well it might meet the "Wisconsin Fancy" quality requirements, be put out in old dirty sections and cases, it cannot be marked and sold as "Wisconsin Fancy." In the "Wisconsin No. 1" grade the new best grade sections must be used but second-hand cases can be used if they are clean. In the "Wisconsin No. 2" grade second-hand or inferior sections can be used and old cases can be used provided they are clean. In all grades the front sections in the case must be a true representation of the contents of the case. This means that honey that grades "Wisconsin Fancy" can not be put in the front of a case and the rest of the case filled up with "Wisconsin No. 1" or "Wisconsin No. 2" honey.

Extracted Honey.—Only one grade of extracted honey is provided. The requirements of "Wisconsin No. 1" extracted honey are that it shall be well ripened and so well strained that it does not contain particles of wax or other foreign materials. An important requirement is that the honey shall weigh at least twelve (12) pounds per gallon at sixty (60) degrees Fahrenheit. Packages of honey containing both comb and extracted honey should be marked according to the regulations for extracted honey.

Color Requirements.—There are five standard colors recognized in the grades for both comb and extracted honey, namely water white, white, light amber, amber and dark. No color designation other than one of these five can be used. The packer of the honey must determine the color. If there is any question between two colors the honey should be marked as of the darker color of the two. It is permissible to mark the honey a darker color than it really is, but not to mark it a lighter color than the honey actually shows. Color statements should not be confused with flavors. No flavor statement is required but the packer of the honey can state the flavor of the honey if he so desires. It should not be included, however, in the official grade and color statement required by the grade rules.

ILLINOIS AS A BEEKEEPING STATE AND ITS PROSPECTS.

(By M. G. Dadant.)

Formerly Illinois ranked as one of the principal states in honey production in the United States. It has dropped from second place as a honey producer to seventh or eighth. This change of condition has probably been due to two things. In the first place other states in the West of larger area and also with more favorable climate and soil have developed wonderfully as bee states so as to outrank our own home state, Illinois.

In the second place we have been hampered for many years in Illinois with foulbrood which has reduced the number of pounds per colony which might be produced from our bees.

Illinois has always been a state of extremes in honey production due largely to climate and soil.

By this I mean that we have had exceedingly large crops at times followed usually by failures or partial failures. This is noticeable most especially in central and southern Illinois.

Years in which the spring and summer have been cool and rainy with sufficient sunshine to allow the bees to work the flowers are usually the best. These have been followed by years of extreme drought which has killed out the clover plants.

An absence of lime in the soil in most localities has aided in this.

Government Bulletin No. 1215 entitled, "The Clover Regions," shows that the best clover producing regions in the United States are in those sections which were in former times covered by the Wisconsin glacial moraines. This glacier covered practically the whole of Canada and extended down into the Northern States of the United States. Only a few small sections of Illinois were covered.

Naturally these favored sections are rich in limestone deposits whereas the balance of the State is lacking in lime in its surface soil.

Strangely enough with an acid soil on top many regions are underlaid with large limestone beds which, if they could be made available, would change an acid to a sweet soil.

Our problem and its solution in Illinois is evidently the application of lime to our soils such as being recommended by the State Agricultural Experiment Stations and by County Farm Bureaus in all sections.

Fortunately this has been adopted to a large extent and we find many counties now raising sweet clover as well as white clover and alsike after having first limed the soil.

This rapid change in farm methods augurs well for the future of beekeeping in Illinois. When we arrive at a point where sweet clover

is considered as a rotation crop by the average farmer we will have arrived at a time when honey production will be rapidly on the increase in this State. That this time is not far off is evidenced by the rapid growth of beekeeping in some counties. We cite for instance the rapid development in Will County, Illinois, where Mr. Edward A. Winkler has been instrumental in scattering the teachings of soil liming and sweet clover sowing.

Many southern Illinois counties ordinarily considered as very poor for farming have been transformed by the liming of the soil and the sowing generally of sweet clover.

Our wintering problem is not a severe one although bees need protection in all parts.

However we have to look squarely at the problem of foulbrood eradication and after this at the problem of adaptation of our farming to the soil and climate by artificial fertilizers, etc.

All in all it looks as if Illinois had passed through some of its worst years in beekeeping and that the future was bright ahead. Surely the rapid development of sweet clover sowing by the average farmer is having its effect.

Although our rainfall and climate cannot guarantee for us a position as one of the best honey producing states yet artificial development of the honey plants through their sowing as general farm crops should have its effect within the next decade or two.

FORMATION OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

SPRINGFIELD, ILL., *February 26, 1891.*

The Capitol Beekeepers' Association was called to order by President P. J. England.

Previous notice having been given that an effort would be made to form a State association, and there being present beekeepers from different parts of the State, by motion, a recess was taken in order to form such an association.

P. J. England was chosen temporary chairman and C. E. Yocum temporary secretary. On motion, the Chair appointed Thos. G. Newman, C. P. Dadant and Hon. J. M. Hambaugh a Committee on Constitution.

Col. Chas. F. Mills addressed the meeting on the needs of a State association and stated that it was his opinion that the beekeepers should have a liberal appropriation for a State Apiarian Exhibit at the World's Columbian Exposition.

A motion to adjourn till 1:30 p. m. prevailed.

AFTERNOON SESSION.

The Committee on Constitution reported a form for same which, on motion, was read by the Secretary, by sections serially.

Geo. F. Robbins moved to substitute the word "shall" for "may" in the last clause of Section 1, Article III. This led to a very animated discussion, and the motion was lost.

J. A. Stone moved to amend the above-named section by striking out the word "ladies" and all that followed of the same section, which motion led to further discussion, and motion finally prevailed.

Section 2, Article II, relating to a quorum, was, on motion, entirely stricken out.

Mr. Robbins moved to amend Article V by adding the words "Thirty days' notice having been given to each member." Prevailed.

Thos. G. Newman moved to adopt the Constitution, so amended, as a whole. Which motion prevailed.

(See Constitution).

J. A. Stone moved that the Chair appoint a Nominating Committee of three on permanent organization: Prevailed.

Chair appointed as such committee, Col. Chas. F. Mills, Hon. J. M. Hambaugh, and C. P. Dadant.

Committee retired and in a few minutes returned, submitting the following named persons as candidates for their respective offices:

For President—P. J. England, Fancy Prairie.

For Vice Presidents—Mrs. L. Harrison, Peoria; C. P. Dadant, Hamilton; W. T. F. Petty, Pittsfield; Hon. J. M. Hambaugh, Spring; Dr. C. C. Miller, Marengo.

Secretary—Jas. A. Stone, Bradfordton.

Treasurer—A. N. Draper, Upper Alton.

Mr. Black moved the adoption of the report of the Committee on Nominations. The motion prevailed, and the officers as named by the committee were declared elected for the ensuing year.

Hon. J. M. Hambaugh moved that Mr. Thos. G. Newman, Editor American Bee Journal, of Chicago, be made the first honorary member of the association. Prevailed.

At this point, Col. Chas. F. Mills said:

Mr. Chairman, I want to be the first one to pay my dollar for membership," at the same time suiting his action to his words, and others followed his example, as follows:

CHARTER MEMBERS.

Col. Chas F. Mills, Springfield.
Hon. J. M. Hambaugh, Spring.
Hon. J. S. Lyman, Farmingdale.
C. P. Dadant, Hamilton.
Chas. Dadant, Hamilton.
A. N. Draper, Upper Alton.
S. N. Black, Clayton.
Aaron Coppin, Wenona.
Geo. F. Robbins, Mechanicsburg.
J. W. Yocum, Williamsville.
Thos. S. Wallace, Clayton.
A. J. England, Fancy Prairie.
P. J. England, Fancy Prairie.
C. E. Yocum, Sherman.
Jas. A. Stone, Bradfordton.

FIRST HONORARY MEMBER.

Thos. G. Newman, Editor American Bee Journal, Chicago.

STATE OF ILLINOIS—DEPARTMENT OF STATE.

ISAAC N. PEARSON, *Secretary of State.*

To all to whom these Presents shall come—GREETING:

Whereas, A certificate duly signed and acknowledged having been filed in the office of the Secretary of State on the 27th day of February, A. D. 1891, for the organization of the Illinois State Beekeepers' Association, under and in accordance with the provisions of "An Act Concerning Corporations," approved April 18, 1872, and in force July 1, 1872, and all acts amendatory thereof, a copy of which certificate is hereunto attached.

Now, Therefore, I, Isaac N. Pearson, Secretary of State, of the State of Illinois, by virtue of the powers and duties vested in me by law, do hereby certify that the said, The Illinois State Beekeepers' Association, is a legally organized corporation under the laws of the State.

In Testimony Whereof, I hereunto set my hand and cause to be affixed the great seal of State.

Done at the city of Springfield, this 27th day of February, in the year of our Lord one thousand eight hundred and ninety-one, and the Independence of the United States the one hundred and fifteenth.

[Seal] I. N. PEARSON, *Secretary of State.*

STATE OF ILLINOIS, } ss.
County of Sangamon, }

To Isaac N. Pearson, Secretary of State:

We, the undersigned, Perry J. England, Jas. A. Stone and Albert N. Draper, citizens of the United States, propose to form a corporation under an act of the General Assembly of the State of Illinois, entitled, "An Act Concerning Corporations," approved April 18, 1872, and all acts amendatory thereof; and for the purposes of such organizations, we hereby state as follows, to-wit:

1. The name of such corporation is, The Illinois State Beekeepers' Association.

2. The object for which it is formed is to promote the general interests of the pursuit of bee-culture.

3. The management of the aforesaid Association shall be vested in a board of three Directors, who are to be elected annually.

4. The following persons are hereby selected as the Directors, to control and manage said corporation for the first year of its corporate existence, viz: Perry J. England, Jas. A. Stone, and Albert N. Draper.

5. The location is in Springfield, in the county of Sangamon, State of Illinois.

(Signed) PERRY J. ENGLAND,
JAS. A. STONE,
ALBERT N. DRAPER,

Sangamon County. } ss.
STATE OF ILLINOIS, }

I, S. Mendenhall, a notary public in and for the county and State aforesaid, do hereby certify that on this 26th day of February, A. D. 1891, per-

sonally appeared before me, Perry J. England, James A. Stone and Albert N. Draper, to me personally known to be the same persons who executed the foregoing certificate, and severally acknowledged that they had executed the same for the purposes therein set forth.

In witness whereof, I have hereunto set my hand and seal the day and year above written.

[Seal] S. MENDENHALL, *Notary Public.*

CONSTITUTION AND BY-LAWS OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

Constitution.

Adopted Feb. 26, 1891.

ARTICLE I.—NAME.

This organization shall be known as The Illinois State Beekeepers' Association, and its principal place of business shall be at Springfield, Ill.

ARTICLE II.—OBJECT.

Its object shall be to promote the general interests of the pursuit of bee-culture.

ARTICLE III.—MEMBERSHIP.

Section 1. Any person interested in apiculture may become a member upon the payment to the Secretary of an annual fee of one dollar and fifty cents ($1.50). (Amendment adopted at annual meeting, December, 1919): And any affiliating association, as a body, may become members on the payment of an aggregate fee of fifty cents (50c) per member, as amended November, 1910.

Sec. 2. Any person may become honorary member by receiving a majority vote at any regular meeting.

ARTICLE IV.—OFFICERS.

Section 1. The officers of this association shall be, President, Vice President, Secretary and Treasurer. Their terms of office shall be for one year, or until their successors are elected and qualified.

Sec. 2. The President, Secretary and Treasurer shall constitute the Executive Committee.

Sec. 3. Vacancies in office—by death, resignation and otherwise—shall be filled by the Executive Committee until the next annual meeting.

ARTICLE V.—AMENDMENTS.

This Constitution shall be amended at any annual meeting by a two-thirds vote of all the members present—thirty days' notice having been given to each member of the association.

By-Laws.

ARTICLE I.

The officers of the association shall be elected by ballot and by a majority vote.

ARTICLE II.

It shall be the duty of the President to call and preserve order at all meetings of this association; to call for all reports of officers and committees; to put to vote all motions regularly seconded; to count the vote at all elections, and declare the results; to decide upon all questions of order, and to deliver an address at each annual meeting.

ARTICLE III.

The Vice Presidents shall be numbered, respectively, First, Second, Third, Fourth and Fifth, and it shall be the duty of one of them, in his respective order, to preside in the absence of the President.

ARTICLE IV.

Section 1. It shall be the duty of the Secretary to report all proceedings of the association, and to record the same, when approved, in the Secretary's book; to conduct all correspondence of the association, and to file and preserve all papers belonging to the same; to receive the annual dues and pay them over to the Treasurer, taking his receipt for the same; to take and record the name and address of every member of the association; to cause the Constitution and By-laws to be printed in appropriate form and in such quantities as may be directed by the Executive Committee from time to time, and see that each member is provided with a copy thereof; to make out and publish annually, as far as practicable, statistical table showing the number of colonies owned in the spring and fall, and the amount of honey and wax produced by each member, together with such other information as may be deemed important, or be directed by the Executive Committee; and to give notice of all meetings of the association in the leading papers of the State, and in the bee journals at least four weeks prior to the time of such meeting.

Sec. 2. The Secretary shall be allowed a reasonable compensation for his services, and to appoint an assistant Secretary if deemed necessary.

ARTICLE V.

It shall be the duty of the Treasurer to take charge of all funds of the association, and to pay them out upon the order of the Executive Committee, taking a receipt for the same; and to render a report of all receipts and expenditures at each annual meeting.

ARTICLE VI.

It shall be the duty of the Executive Committee to select subjects for discussion and appoint members to deliver addresses or read essays, and to transact all interim business.

ARTICLE VII.

The meeting of the association shall be, as far as practicable, governed by the following order of business:

Call to order.
Reading minutes of last meeting.
President's address.
Secretary's report.
Treasurer's report.
Reports of committees.
Unfiinished business.
Reception of members and collection.
Miscellaneous business.
Election and installation of officers.
Discussion.
Adjournment.

ARTICLE VIII.

These By-Laws may be amended by a two-thirds vote of all the members present at any annual meeting.

C. E. YOCOM.
AARON COPPIN.
GEO. F. ROBBINS.

Following is a copy of the law passed by the Illinois Legislature May 19, and signed by the Governor June 7, 1911, to take effect July 1, 1911:

STATE FOUL BROOD LAW.

State Inspector of Apiaries.

Preamble.
§ 1. State Inspector of Apairies—appointment — term — assistants —per diem.
§ 2. Foul Brood, etc.—what declared nuisances—inspection—notice to owner or occupant—treatment—abatement of nuisance—appeal.
§ 3. Annual Report.
§ 4. Penalties.

House Bill No. 670.

(Approved June 7, 1911.)

AN ACT *to prevent the introduction and spread in Illinois of foul brood among bees, providing for the appointment of a State Inspector of Apiaries and prescribing his powers and duties.*

Whereas, the disease known as foul brood exists to a very considerable extent in various portions of this State, which, if left to itself, will soon exterminate the honey bees; and

Whereas, the work done by an individual beekeeper or by a State inspector is useless so long as the official is not given authority to inspect and, if need be, to destroy the disease when found; and

Whereas, there is a great loss to the beekeepers and fruit growers of the State each year by the devasting ravages of foul brood;

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That the Governor shall appoint a State Inspector of Apiaries, who shall hold his office for the term of two years, and until his successor is appointed and qualified, and who may appoint one or more assistants, as needed, to carry on the inspection under his supervision. The Inspector of Apiaries shall receive for each day actually and necessarily spent in the performance of his duties the sum of four dollars to be paid upon bills of particulars certified to as correct by the said State Inspector of Apiaries, and approved by the Governor.

Sec. 2. It shall be the duty of every person maintaining or keeping any colony or colonies of bees to keep the same free from the disease known as foul brood and from every contagious and infectious disease among bees. All beehives, beefixtures or appurtenances where foul brood or other contagious or infectious diseases among bees exists, are hereby declared to be nuisances to be abated as hereinafter prescribed. If the inspector of apiaries shall have reason to believe that any apiary is infected by foul brood or other contagious disease, he shall have power to inspect, or cause to be inspected, from time to time, such apiary, and for the purpose of such inspection he, or his assistants, are authorized during reasonable business hours to enter into or upon any farm or premises, or other building or place used for the purpose of propagating or nurturing bees. If said inspector of apiaries, or his assistants, shall find by inspection that any person, firm or corporation

is maintaining a nuisance as described in this section, he shall notify in writing the owner or occupant of the premises containing the nuisance so disclosed of the fact that such nuisance exists. He shall include in such notice a statement of the conditions constituting such nuisance, and order that the same be abated within a specified time and a direction, written or printed, pointing out the methods which shall be taken to abate the same. Such notice and order may be served personally or by depositing the same in the postoffice properly stamped, addressed to the owner or occupant of the land or premises upon which such nuisance exists, and the direction for treatment may consist of a printed circular, bulletin or report of the Inspector of Apiaries, or an extract from same.

If the person so notified shall refuse or fail to abate said nuisance in the manner and in the time prescribed in said notice, the Inspector of Apiaries may cause such nuisance to be abated, and he shall certify to the owner or person in charge of the premises the cost of the abatement and if not paid to him within sixty days thereafter the same may be recovered, together with the costs of action, before any court in the State having competent jurisdiction.

In case notice and order served as aforesaid shall direct that any bees, hives, beefixtures or appurtenances shall be destroyed and the owner of such bees, hives, beefixtures or appurtenances shall consider himself aggrieved by said order, he shall have the privilege of appealing within three days of the receipt of the notice to the County Court of the county in which such property is situated. The appeal shall be made in like manner as appeals are taken to the County Court from judgments of justices of the peace. Written notice of said appeal served by mail upon the Inspector of Apiaries shall operate to stay all proceedings until the decision of the County Court, which may, after investigating the matter, reverse, modify or affirm the order of the Inspector of Apiaries. Such decision shall then become the order of the Inspector of Apiaries, who shall serve the same as hereinbefore set forth and shall fix a time within which such decision must be carried out.

Sec. 3. The Inspector of Apiaries shall, on or before the second Monday in December of each calendar year, make a report to the Governor and also to the Illinois State Beekeepers' Association, stating the number of apiaries visited, the number of those diseased and treated, the number of colonies of bees destroyed and the expense incurred in the performance of his duties.

Sec. 4. Any owner of a diseased apiary or appliances taken therefrom, who shall sell, barter or give away any such apiary, appliance, queens or bees from such apiary, expose other bees to the danger of contracting such disease, or refuse to allow the Inspector of Apiaries to inspect such apiary, or appliances, shall be fined not less than $50 nor more than $100.

Approved June 7, 1911.

(Bill passed in the 50th General Assembly.)

BEEKEEPERS' ASSOCIATION.

THE ORIGINAL BILL.

§ 1. Appropriates $1,000 per annum—proviso.
§ 2. How drawn.
§ 3. Annual Report.

AN ACT *making an appropriation for the Illinois State Beekeepers' Association.*

Whereas, The members of the Illinois State Beekeepers' Association have for years given much time and labor without compensation in the endeavor to promote the interests of the beekeepers of the State; and,

Whereas, The importance of the industry to the farmers and fruit-growers of the State warrants the expenditure of a reasonable sum for the holding of annual meetings, the publication of reports and papers containing practical information concerning beekeeping, therefore, to sustain the same and enable this organization to defray the expenses of annual meetings, publishing reports, suppressing foul brood among bees in the State, and promote the industry in Illinois;

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That there be and is hereby appropriated for the use of the Illinois State Beekeepers' Association the sum of one thousand dollars ($1,000) per annum for the year 1917, 1918, for the purpose of advancing the growth and developing the interests of the beekeepers of Illinois, said sum to be expended under the direction of the Illinois State Beekeepers' Association for the purpose of paying the expenses of holding annual meetings, publishing the proceedings of said meetings suppressing foul brood among bees in Illinois, etc.

Provided, however, That no officer or officers of the Illinois State Beekeepers' Association shall be entitled to receive any money compensation whatever for any services rendered for the same, out of this fund.

Sec. 2. That on the order of the President, countersigned by the Secretary of the Illinois State Beekeepers' Association, and approved by the Governor, the Auditor of Public Accounts shall draw his warrant on the Treasurer of the State of Illinois in favor of the treasury of the Illinois State Beekeepers' Association for the sum herein appropriated.

Sec. 3. It shall be the duty of the Treasurer of the Illinois State Beekeepers' Association to pay out of said appropriation, on itemized and receipted vouchers, such sums as may be authorized by vote of said organization on the order of the President countersigned by the Secretary, and make annual report to the Governor of all such expenditures, as provided by law.

Itemized in the Omnibus Bill as follows:

For shorthand reporting	$ 200.00
For postage and stationery	50.00
For printing	550.00
Expense of meetings	200.00
Total amount of the appropriation	$1,000.00

The Assembly ruled that this is not to be paid in *lump* but drawn on itemized accounts.

CODE OF RULES AND STANDARDS FOR GRADING APIARIAN EXHIBITS AT FAIRS AS ADOPTED BY ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

COMB HONEY.

Rule 1. Comb honey shall be marked on a scale of 100, as follows:

Quantity	40	Style of display	20
Quality	40		

Rule 2. Points of quality should be:

Variety	5	Straightness of comb	5
Clearness of capping	10	Uniformity	5
Completeness of capping	5	Style of section	5
Completeness of filling	5		

Remarks: 1. By variety is meant different kinds, with regard to the sources from which the honey is gathered, which adds much interest to an exhibit.

2. By clearness of capping is meant freedom from travel stain and a water soaked appearance. This point is marked a little high, because it is a most important one. There is no better test of the quality of comb honey than the appearance of the cappings. If honey is taken off at the proper time, and cared for as it should be, so as to preserve its original clear color, body and flavor will take care of themselves, for excellence in the last two points always accompanies excellence in the first. Clover and basswood honey should be white; heartsease, a dull white tinged with yellow; and Spanish needle, a bright yellow.

3. By uniformity is meant closeness of resemblance in the sections composing the exhibit.

4. By style is meant neatness of the sections, freedom from propolis, etc.

5. Honey so arranged as to show every section should score the highest in style of display, and everything that may add to the tastiness and attractiveness of an exhibit should be considered.

EXTRACTED HONEY.

Rule 1. Extracted honey should be marked on a scale of 100, as follows:

Quantity	40	Style and display	15
Quality	45		

Rule 2. Points of quality should be:

Variety	10	Style of package	10
Clearness of color	5	Variety of package	5
Body	5	Finish	5
Flavor	5		

Remarks: 1. Light clover honey pouring out of a vessel is a very light straw color; Spanish needle, a golden hue, and dark clover honey, a dull amber.

2. Style of package is rated a little high, not only because in that consists the principal beauty of an exhibit of extracted honey, but also because it involves the best package for marketing. We want to show honey in the best shape for the retail trade, and that, in this case, means the most

attractive style for exhibition. Glass packages should be given the preference over tin; flint glass over green, and smaller vessels over larger, provided the latter run over one or two pounds.

3. By variety of package is meant chiefly different sizes; but small pails for retailing, and, in addition, cans or kegs (not too large) for wholesaling, may be considered. In the former case, pails painted in assorted colors, and lettered "Pure Honey", should be given the preference.

4. By finish is meant capping, labeling, etc.

5. Less depends upon the manner of arranging an exhibit of extracted than of comb honey, and for that reason, as well as to give a higher number of points to style of package, a smaller scale is allowed for style of display.

SAMPLES OF COMB AND EXTRACTED HONEY.

Rule 1. Single cases of comb honey, entered as such for separate premiums, should be judged by substantially the same rules as those given for a display of comb honey, and samples of extracted, by those governing displays of extracted honey.

Rule 2. Samples of comb or extracted honey, as above, may be considered as part of the general display in their respective departments.

GRANULATED HONEY.

Rule 1. Candied or granulated honey should be judged by the rules for extracted honey, except as below.

Rule 2. Points of quality should be:

Variety	10	Style of package	10
Fineness of grain	5	Variety of package	5
Color	5	Finish	5
Flavor	5		

Rule 3. An exhibit of granulated honey may be entered or considered as part of a display of extracted honey.

NUCLEI OF BEES.

Rule. Bees in observation hives should be marked on a scale of 100, as follows:

Color and markings	30	Quietness	5
Size of bees	30	Style of comb	5
Brood	10	Style of hive	10
Queen	10		

Remarks: 1. Bees should be exhibited only in the form of single frame nuclei, in hives or cages with glass sides.

2. Italian bees should show three or more bands, ranging from leather color to golden or light yellow.

3. The markings of other races should be those claimed for those races in their purity.

4. A nucleus from which the queen is omitted should score zero on that point.

5. The largest quantity of brood in all stages or nearest to that should score the highest in that respect.

6. The straightest, smoothest and most complete comb, with the most honey consistent with the most brood, should score the highest in that respect.

7. That hive which is neatest and best made and shows the bees, etc., to the best advantage should score the highest.

QUEEN BEES.

Rule. Queen bees in cages should be marked on a scale of 100, as follows:

Quantity ..... 40 Quality and variety..... 40
Style of caging and display..... 20

Remarks: 1. The best in quality consistent with variety should score the highest. A preponderance of Italian queens should overweigh a preponderance of black ones, or, perhaps, of any other race or strain; but sample queens of any or all varieties should be duly considered. Under the head of quality should also be considered the attendant bees. There should be about a dozen with each queen.

2. Neatness and finish of cages should receive due consideration, but the principal points in style are to make and arrange the cages so as to show the inmates to the best advantage.

BEESWAX.

Rule. Beeswax should be marked on a scale of 100, as follows:

Quantity ..... 40 Quality 40
Style of display..... 20

Remarks: 1. Pale, clear, yellow specimens should score the highest, and the darker grades should come next in order.

2. By style is meant chiefly the forms in which the wax is molded and put up for exhibition. Thin cakes or small pieces are more desirable in the retail trade than larger ones. Some attention may be given to novelty and variety.

FOUL BROOD IN BEES.

So important it is to be well posted on the two most important, and likewise, most destructive, diseases of bees, that a full description of the diseases and their treatment is herewith given. These are taken verbatim from Bulletins Nos. 2 and 5 of the Michigan Apiary Inspection Division and were written by Michigan's present State Bee Inspector, Mr. B. F. Kindig.

AMERICAN FOULBROOD.

American Foul Brood is an infectious disease of the larvae of the honey bee.

CAUSE.

The disease is caused by a microscopic organism similar in appearance and habits to some of the germs which cause disease in the human body. The organism is known as *Bacillus larvae.*

SYMPTOMS.

To the beekeeper who is unfamiliar with this disease, usually the first symptoms apparent are a gradual weakening of the colony and the presence of a very unpleasant odor in the hive. In the very early stages of the disease it is recognized by an occasional brood cell capping being sunken and darker in appearance than the cappings of the adjacent cells. A part of these cappings may also have small holes in them, often ragged in appearance. Upon further examination it may be found that in a few uncapped cells the larvae have died and are decaying on the lower cell walls. Upon careful examination, the dead larval remains in all of the cells just mentioned will be found to be similar in shape and position, although they may vary somewhat in color. Soon after the death of the larva it begins to take on a brownish appearance and the longer the larva has been dead and the more it becomes dried down the darker is the color. When the remains have dried down to a thin scale on the lower cell wall the color becomes almost black. When larvae die from this disease the decayed remains tend to become quite gluey in their consistency. If a match or tooth-pick be inserted into the cell and a part of the remains drawn out it will be found to stretch out somewhat like glue. This quality is commonly spoken of as ropiness and is often considered the diagnostic symptom of this disease. However, in making a diagnosis these four factors should be present:

(1) The larvae should lie on the lower cell wall.

(2) The color should be brown or black.

(3) The consistency of the larvae should be ropy unless dried down into a black hard scale.

(4) The odor should be repulsive, inamuch as it is commonly described as smelling like a glue pot.

Even in a very mild case of disease the first three symptoms should be apparent while the fourth (the odor) may not be so noticeable if only a few cells are affected. Whenever there is the slightest doubt as to the diagnosis of disease a sample of the comb containing the diseased larvae

should be sent to the U. S. Department of Agriculture, Bee Culture Laboratory, Washington, D. C., where a microscopic examination will be made. Upon application, the department will gladly furnish a mailing case for sending in samples of comb for disease identification.

TREATMENT.

The only successful treatment for American Foulbrood consists in removing the bees from the combs and hives and placing them in a clean hive without combs but in which the frames are fitted with full sheets of foundation. There are slight variations in the method of treatment according to the season of the year. These slight differences will be fully discussed under the method of treatment for the particular season. If it is at all possible to avoid it, a diseased colony should never be treated in the same yard with colonies that are not diseased. Wherever possible, the diseased colonies should be removed a mile or more from the yard, given the proper treatment and then returned to the yard. Whenever treating for disease one should give due consideration to the location of other beekeepers in order that disease may not be spread by robbing during the process of treatment.

SPRINGTIME TREATMENT.

When it is desired to treat the bees in the spring as early as possible and when more than one colony is diseased, it is possible to save the brood of each colony excepting the last one treated by the following plan:

Pick out from among the diseased colonies the ones which are deemed strong enough to stand the shock of treatment during the month of May. Each of these colonies should be transferred into clean hives with full sheets of foundation and the brood which they had should be placed on one or more of the weaker diseased colonies. In the process of transferring, the diseased colony is placed two feet or so to the back or side of where it formerly stood. The hive into which it is desired to transfer the bees is placed on the old stand. After placing a newspaper in front of the hives to catch any honey that may drip, then taking one frame at a time the bees should be brushed upon the paper in front of the new hive. Care should be used to see that the queen enters the new hive. After she is in, a queen-guard or queen and drone trap should be placed on the entrance to prevent the swarm from absconding. After all the bees have been removed, the combs may be placed on another diseased colony as said before. If only one colony is affected then the combs should be buried deeply or burned. In all of the manipulations concerned with the handling of disease every precaution must be used in order that no robbing may take place. If any robbing occurs it is quite certain that each colony concerned in the robbing will later become diseased. For this reason it is customary to treat diseased bees late in the evening after the bees quit flying. If it is necessary to treat them in a yard where there are healthy colonies, then the entrances to all the adjacent healthy colonies should be closed with a screen so that in the excitement and confusion incident to transferring if any of the bees from the diseased hive attempt to enter they will be unable to do so. If it is impractical to remove the bees from the yard for treatment, then the hives should be moved a foot or more each day until the diseased hives are as far as they can be placed in the yard from other colonies. Many beekeepers who have treated disease from year to year find it advisable to use a screened cage about six feet square and six feet high. They perform all of the work of transferring within this cage. In this way it is impossible for robbers to enter or for any of the bees of the colony to enter another hive. Whenever bees are disturbed as in transferring they fill their honey sacs with honey. In case it is a diseased colony the honey which they carry may transmit disease to any colony which such bees may enter. It

is, therefore, very essential that all of the bees of a diseased colony be kept together. Colonies which are strong enough to admit of treatment in the month of May should build up and store a satisfactory amount of honey during the following honey flow.

SUMMER TREATMENT.

Weak colonies on which the brood was stacked from the colonies treated in May, or other colonies which were too weak for treatment at that time should be treated during the first few days of the main summer honey flow which in this State is either the basswood or clover flow. The same method of treatment should be followed as described previously, excepting that in case some colonies are not strong enough at that time to produce surplus honey, then, two or more colonies should be united at the time of treatment. It is not advisable to handle colonies in such a way that the surplus honey crop is entirely sacrificed. If an increase in the number of colonies is desired, it can be made in the latter part of the clover flow with but very slight sacrifice in the honey crop. The brood from five or six treated colonies can be piled upon one diseased colony and after three weeks when all of the brood is hatched, then the remaining colony should be treated. Whether or not all of the colonies are to be treated at the beginning of the main honey flow is optional with the beekeeper. If they are all treated at that time all frames containing brood must be burned or buried at once. If some of the diseased colonies are still weak it is probably best to pile the brood from those that are strong enough on them and arrange to treat three weeks later. However, when treatment is delayed until three weeks after the beginning of the honey flow in some instances not sufficient time is left for them to store honey enough for their needs. In this case they will have to be fed later.

FALL TREATMENT.

It occasionally happens that a colony which becomes infected in the spring may not be discovered until after the clover honey crop has been gathered. In general, it is not advisable to treat bees when there is no honey flow. The danger of robbing under such conditions is very much greater and feeding must be resorted to in order to keep the colony alive. Late cases of infection may be treated during the month of October after brood rearing has practically ceased. The method of treatment is the same as described before, excepting that the bees are transferred into a hive without frames. They should be left in this hive for at least 48 hours. At that time the beekeeper should carefully remove the hive body from the bottom board. A hive body full of combs of honey taken from a healthy colony should be set in its place. Then the empty hive body with the bees should be set on top and jarred slightly. The bees will then take possession of the combs and honey and the empty hive body may be removed.

FEEDING IN CONNECTION WITH TREATMENT.

When it is desirable to treat very early in the season it is occasionally necessary to resort to feeding in order to get the foundation drawn out and to get brood rearing under way as quickly as possible. Realizing that the bees carry with them a supply of honey which is sufficient for their food for several days, it is not necessary to do any feeding until two to three days after treatment. It is very fortunate that in the digesting of the disease carrying honey which the bees have in their honey sacs at the time of treatment, all danger of disease is eliminated. When bees are placed on foundation they very rapidly use up the honey which they have with them in the secretion of wax for comb building. For this reason it is not advisable in treating disease to give the colony a set of drawn combs. When this is done

they deposit the honey which they carry with them in the cells and part of it is fed to the young larvae which they proceed to rear. Thus the disease which was present in the old hive is continued in the new one. When it is necessary to feed, the use of a Boardman entrance feeder or an Alexander bottom board is very convenient. If these are not at hand a very efficient feeder can be made by punching a number of fine holes in the lid of a friction top pail. This should be filled with syrup and inverted directly over the frames. The bees will then suck out the syrup.

DISPOSAL OF WAX AND HONEY.

Where only a small number of colonies are treated the best means of disposal of the frames and honey is to burn or bury them. In cases where a large yard is quite generally diseased it then becomes advisable to save as much of the equipment as possible. After the brood has been allowed to emerge as previously mentioned, then the hive bodies of combs should be removed to a bee-tight building. There the honey should be extracted at once. The honey may be used for making honey vinegar. It is not desirable to sell this honey as it may be exposed by the purchasers in such a way that bees may secure some of it and thus carry the disease to their own hives.

After extracting, unless a very cold cellar is available for storing the combs, it is necessary to cut the combs out and melt them at once because of the danger of wax moths at that season. No one should ever attempt to ship diseased combs to a foundation factory for rendering, excepting during the months of December, January and February. When combs are packed in a barrel and shipped, very often honey leaks out upon the floors of the cars or in the freight houses and becomes accessible to the bees of the vicinity. This practice is forbidden by law in most states including Michigan.

After disposing of the combs and honey the frames should be boiled for not less than five minutes in a solution made from one can of concentrated lye to six gallons of water. Before placing the frames in this solution the wax and propolis should be carefully removed. After boiling, the frames should be thoroughly rinsed in a tub of clear, warm water. The hive bodies, super covers and bottom boards, should be thoroughly scraped to remove all particles of wax, honey and propolis. Then they should be gone over with a flame of a blow torch and the surface scorched until no germs can remain alive. Ordinarily supers and hive bodies are more easily sterilized by piling them up-side-down as high as one can conveniently reach and burning a small handful of straw or paper on the inside. Care must be exercised else the whole pile of supers will be burned up. A hive cover should be convenient for putting over the top to stop the blaze.

It must be realized that there is grave danger in the handling of diseased material unless every precaution is taken to prevent robbing. The extractor should be thoroughly scalded out after extracting diseased honey. If possible the extractor should be taken to where it may be turned up-side-down and a steam hose turned into it with considerable pressure for at least 15 minutes. If the wax is rendered, the slumgum and the water used in wax rendering should be buried after the bees have quit flying in the evening. All vessels or tools which come in contact with the disease must be thoroughly disinfected. If the above directions are followed carefully much valuable material may be saved. If not, Foul Brood will be scattered far and wide over the adjacent territory.

METHODS OF SPREAD.

American Foul Brood is commonly spread through carelessness on the part of someone. If carelessness on the part of beekeepers could be eliminated the problem of controlling Foul Brood would be very much simpli-

fied. Weak diseased colonies may be robbed out because the entrances have not been contracted to a point where they can defend themselves. Dead diseased colonies are robbed out because the beekeeper's carelessly leaves such colonies exposed in the bee-yard. It is a beekeeper's business to know whether any colonies are dead or weak, and it is his business to take care of them so that they may not be a menace to the neighboring beekeepers. The careless exposure of disease carrying honey and the like is criminal and the offender should be punished by nothing less than confinement in the county jail. Often honey houses and other places where diseased honey and combs are stored have cracks in the doors or windows or the siding does not fit properly and whatever is contained therein is exposed to all of the bees in the territory. Often hives in which the colonies have died from disease are sold either through ignorance of the seller, or as has been amply demonstrated, because his sense of right and justice has never been properly developed. A careful survey of conditions in Wisconsin showed that a large part of the spread of foul brood was directly traceable to the selling or moving of diseased hives or equipment. The feeding of honey, a part of which was extracted from a diseased colony, causes an outbreak of disease wherever such honey is fed. It is not always possible to know whether or not some of it may have come from a diseased hive even though no disease is known to be present in the bee-yard. Some of the honey in the yard may have been stored from honey robbed from a diseased colony in the neighborhood.

BEE YARD SANITATION.

The bee-yard practice must be such as to prevent robbing.

Frames of honey should not be taken from one colony and given as food to another colony.

A diseased colony should never be opened when there is the slightest danger of robbing.

Diseased colonies should be removed from the yard as soon as discovered and treated before returning them.

Carelessness, ignorance and malice are at the bottom of most of the spread of disease.

Do not use equipment from an unknown source without seeing to it that it can not carry disease.

When a colony shows disease every frame connected with that colony must be destroyed. Some have erroneously judged that those frames which do not have dead larvae in them are suitable for further use.

In purchasing bees buy them in combless packages, not on drawn combs, unless there has been no disease among the bees for at least one year. The selling of diseased bees contributed largely to the spread of disease in Michigan.

Every super and every frame should be numbered to correspond with the hive on which it belongs and should be used there and nowhere else. If this suggestion is followed, extracted honey producers will find that foulbrood is just as easy to control in their yards as in the yards of comb honey producers.

EUROPEAN FOUL BROOD.

European Foul Brood is a bacterial disease which causes the death of the larvae of workers, queens, and drones. It attacks them normally when they are about three days old and usually kills them before the cells are capped. The disease is quite variable in its severity; in some cases most of the uncapped larvae are affected while in other colonies or under different conditions of season or honey flow, but very few larvae may be attacked.

DISTRIBUTION.

European Foul Brood is found in nearly all sections of the Country, and in Illinois is prevalent in Central and Northern Illinois. Several years ago Dr. E. F. Phillips of the Bureau of Entomology, United States Depart-

ment of Agriculture, called the attention of the writer to what seemed to be a striking coincidence, in that European Foul Brood seemed to be particularly virulent on the poorer types of soil. The truth of this statement seems to be well borne out in the distribution of the disease in the various counties. While the disease is frequently met with on the heavier types of soil, yet it appears as a serious menace largely on the lighter soils where there is but little incoming nectar during the spring and early summer months. There are many counties in the State from which the disease has not been reported. This should not be construed to mean that such territories are immune from the malady. On the contrary, it seems to be purely an accident that this trouble has not appeared in many of these counties.

PREDISPOSING CONDITIONS.

As noted above, areas in which there are but few nectar secreting flowers during the early part of the season seemed to be favorable for the development of the disease. As Italian bees are essential for the control of this disease, it therefore follows that in those communities where the black bees predominate European Foul Brood is particularly serious. It has also been noted that the poor wintering of bees is exceedingly favorable to rapid progress of the disease. Those colonies are particularly susceptible which are weak in numbers and slow to build up either because of insufficient strength or because of the presence of a failing queen.

STRENGTH OF COLONY IN RELATION TO DISEASE.

Strong colonies of bees attempt to eradicate the disease from the hive by carrying out the dead larvae. This reminds one of the reaction of a strong colony to the presence of wax moths. Weak colonies seem to make but little effort to clean out the diseased larvae as they appear. The carrying out of the dead larvae seems to be an important factor in retarding the spread of the disease within the colony. Nurse bees have often been observed sucking the juices from the bodies of the dead larvae. Doubtless the nurse bees, because of their contamination with the bacteria, form the principal agency in the dissemination in the hive.

Very little is definitely known regarding the spread of the disease from hive to hive or from one apiary to another. It has been definitely shown, however, that the disease can be transferred by the agency of the honey taken from the diseased colonies.

DIAGNOSIS.

The larvae are first affected by European Foul Brood while they are curled up in the backs of the cells adjacent to the midrib of the comb. Frequently the larvae seem to move slightly before death and dead larvae change in color from pearly white to gray or yellow and if permitted to remain in the cells they may become a yellowish brown or brown in color. The larvae do not adhere tightly to the cell walls. In serious cases there is usually a decided odor. There is but slight ropiness, if any at all. Queen, worker, and drone larvae seem to be equally susceptible to the disease.

In case of any doubt in diagnosis of disease, write to the Bee Culture Laboratory, Department of Agriculture, Washington, D. C., asking for a box in which to mail a sample of the diseased comb. The comb should not be wrapped in waxed paper nor mailed in tin containers.

TREATMENT.

During the past ten years the methods of treatment for European Foul Brood have been changed quite radically. The transferring of the bees from the diseased hive is no longer advocated.

E. W. Alexander of New York and Dr. C. C. Miller of Illinois, demonstrated conclusively that the destruction of combs and the loss of brood were unnecessary in treating this disease. Dr. E. F. Phillips has summed up the whole matter of preventive measures: "The practices of good beekeeping are those which result in the eradication of European Foul Brood."*

Every beekeeper should look forward to the possibility of European Foul Brood becoming epidemic in his apiary. Preventive measures are therefore indicated rather than awaiting the coming of the disease and then attempting to remedy the situation. The following points are particularly important in this connection: Young queens, an abundance of food, suitable winter protection, Italian blood, and strong colonies.

In combating the disease after it has appeared, the queens of the diseased colonies should be killed and Italian queens of known resistance should be introduced as soon as the bees have had an opportunity to free the combs from all dead larvae. The length of time required for removing the dead larvae depends upon the race of bees and strength of the colonies as well as the amount of infection present. If colonies are weak, it is frequently desirable to unite two or more colonies. The uniting of two weak discouraged diseased colonies frequently results in a complete change of morale and a quick cleaning up of the diseased material.

In those apiaries where most colonies are headed with resistant stock, it is unnecessary to send away for queens. Ripe queen cells from the best queens may be introduced into the colonies at the time the old queens are killed or a few days later depending upon the severity of the disease. If the cells are introduced some time after the removal of the queens, then a careful examination of the combs must be made and all queen cells removed before introducing the ripe cells. Negligence in this matter may result in a hopelessly queenless colony due to the destruction by the bees of the cell introduced and by the blasting of the cells reared by the colony because of the disease present.

In connection with the treatment for disease, beekeepers frequently find it advantageous to feed a thin syrup at frequent intervals. After requeening all diseased colonies the beekeeper should keep very close watch of the performance of the various queens. He should begin rearing young queens from those queens which seem to produce colonies most resistant to the disease. The beekeeper should not depend entirely upon purchasing queens from regular queen breeders. He should learn to rear his own queens from those which he knows are fully capable of carrying their colonies through the season without a severe outbreak of disease. The vigor of a queen seems to be impaired by shipping through the mail. Vigor is of exceeding importance in queens in apiaries where disease is present.

*Farmers' Bulletin 975, "The Control of European Foul Brood," by Dr. E. F. Phillips.

LIST OF MEMBERS FOR ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR 1922.

Adam, Edgar, Strawn, Ill.
Aikman, H. L., Farmersville, Ill.
Allen, H. E., Carbondale, Ill.
Allen, L. R., Carbondale, Ill.
Allen, Ralph, Jr., Delavan, Ill.
Amees, Harvey, R. 1, Mattoon, Ill.
Anderson, Joe, Carbondale, Ill.
Anderson, Robert, Chatham, Ill.
Anderson, W. R., Normal, Ill.
Annear, Roy, R. 2, Mulkeytown, Ill.
Antle, Marshall B., Berlin, Ill.
Archer, W. L., McLean, Ill.
Arrowsmith, Mrs. H. P., Gibson City, Ill.
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Balduff, Henry, Beardstown, Ill.
Baltimore, Guy, Woodhull, Ill.
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Barbe, W. P., R. 1, Tennessee, Ill.
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Baxter, E. J., Nauvoo, Ill.
Bear, Wm. F., Buena Vista, Ill.
Beaver, Wallace R., Lincoln, Ill.
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Berry, Eugene F., R. 4, Taylorville, Ill.
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Bishop, E. E., 4017 Moody Ave., Chicago, Ill.
Bishop, Frank, Taylorville, Ill.
Blume, W. B., Norwood Park, Ill.
Blume, W. B., 6505 Normal Park Ave., Chicago, Ill.
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Boyer, J. T., Champaign, Ill.
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Brandon, Wm. A., Carbondale, Ill.
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Brockman, John, Glenview, Ill.
Brockman, Val H., 204 N. 4th St., Streator, Ill.
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Brown's Hdw., Newark, Ill.
Brown, Anderson, Normal, Ill.
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Colyer, Prof. Frank H., Carbondale, Ill.
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Concidine, Roy, R. 3, care of Grant Mosher, DeKalb, Ill.
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Cooper, A. C., Wyoming, Ill.
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Cushman, Sampel, Room 505, 6 E. Lake St., Chicago, Ill.
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Dadant, L. C., Hamilton, Ill.
Dadant, M. G., Hamilton, Ill.
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INDEX.

PAGE.

Adams County Inspector Report..... 30
American Honey Producers' League.....136
Associations, List of..... 9
Baxter, A. C..... 14
Beekeepers Must Organize..... 36
Bees and Horticulture..... 38
Brigham, W. B..... 91
Cale, G. H.....126, 127
Chart Showing Relation of Stores to Brood Rearing.....128
Christian County Inspector Report..... 29
Cost of Honey Production..... 76
County Inspectors' Reports..... 28
Cushman, Samuel 47
Dadant, C. P.....68, 105
Dadant, M. G.....18, 148
Demuth, Geo. S.....94, 122
Disart Apiary, F.....123
Douglas County Inspector Report..... 30
Effect of Spraying on Bees..... 80
Ex-Service Men in Beekeeping..... 44
Food Laws on Honey in Illinois.....131
Foulbrood, American 162
Foulbrood, European 166
Foulbrood Law 156
Fracker, S. B.....136
Future of Illinois Beekeeping..... 73
Gilcrist, J. J..... 44
Gill, A. G..... 73
Grading Honey 144
Grading Rules for Fair Exhibit.....159
Growing Hubam 60
Hancock County Inspector Report..... 31
Henry County Beekeepers are Boosters.....102
Henry County Inspector Report..... 31
Honey Candies and Their Making.....113
Honey Sandwiches 101
How to Sell Honey.....133
Hubam Clover and the Honey Crop..... 33
Hubam Clover for the Farmer..... 87
Hubam Stalk 61
Illinois as a Beekeeping State and Its Prospects.....148
Illinois State Beekeepers' Association.....150

PAGE.
Increased Efficiency of Production..... 97
Is the Large Hive a Dangerous Fad?.....109
Jackson County Inspector Report..... 30
Kildow, A. L..... 26
King, Geo. E..... 51
Kommer, Elmer 102
Langstroth, L. L..... 10
Latham, Allen 82, 101, 113
Laws in Illinois.....152
LeStourgeon, E. G.....133
Letter of Transmittal..... 3
List of Members.....169
McLean County Field Meet..... 92
Marketing Honey 140
Minutes of Chicago-Northwestern Convention..... 23
Minutes of 1922 Meeting..... 11
Officers of State Association..... 5
Organization 41
Paddock, F. B..... 97
Pellett, F. C..... 76
Phillips, E. F..... 64
Popular Errors 68
President's Address 13
Rearing of Good Queens..... 82
Results of Organization of Cook County Beekeepers..... 47
Root, E. R.....109, 140
Sangamon County Inspector's Report..... 29
Seastream, George 22
Secretary, Report of..... 20
Securing Illinois Place in Beekeeping..... 51
Some High Points in Hubam and Honey Production.....117
State Apiary Inspector Report..... 25
State Association Constitution and By-Laws.....154
State Funds, Report of Expenditure of..... 19
Stores as Crop Insurance.....126
Sugar Candy Inserted in Cluster..... 74
Swarming 122
Sweet Clover in the Shock..... 88
The New Beekeeping..... 94
Treasurer, Report of..... 21
Wabash County Inspector Report..... 29
Wax Secretion 105
Welch Apiary, E. A..... 25
What a County Association can Accomplish..... 91
Why Our Association has Succeeded.....102
Wilson, H. F.....38, 80
Edw. Winkler with Seed Cleaner.....119
Winkler, Edw. A.....33, 60, 87, 117
Wintering Bees in Illinois..... 64
Woolridge, J. R..... 36
Yost, C. O..... 41

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